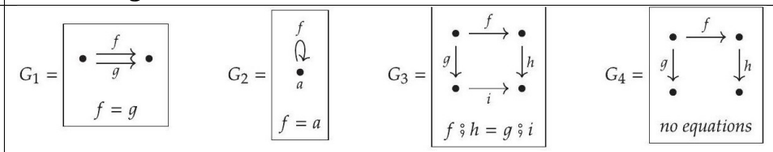
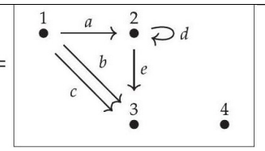
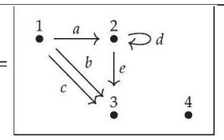
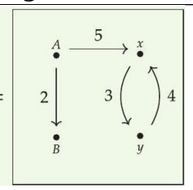
fong-spivak-invitation — formula report

4061 inline formulas (section omitted; 1 did not render), 262 display equations, 68 tables, 505 unrecovered image regions.

Display equations

Identifier	Page	Conf.	LaTeX source	Rendered	Scan image
fong-spivak-invitation_EQ0202 **[conf 0.001]**	291	■ 0.001 ● U|+70	`G_{1}=\begin{array}{|c|} \hline \text { 孛 } \\ f=g \end{array} \quad G_{2}=\begin{array}{|c|} \hline f \\ \stackrel{\mathcal{Q}}{a} \\ f=a \end{array} \quad G_{3}=\begin{array}{|ccc|} \bullet & \xrightarrow{f} & \bullet \\ g \downarrow & & \downarrow i \\ \bullet & \xrightarrow{h} & \bullet \\ f \circ h & = & g \circ i \end{array} \quad G_{4}=\begin{array}{|cc|} \bullet & \stackrel{f}{\longrightarrow} \bullet \\ g \downarrow & \downarrow h \\ \bullet & \bullet \\ \text { no equations } \end{array}`	*(not rendered)*	
fong-spivak-invitation_EQ0062 **[conf 0.001]**	113	■ 0.001 ● C|+8	`I=\left\lvert\, \begin{array}{ccc} 1 & a & 2 \\ & \downarrow & \downarrow \\ & \triangleright & 3 \\ & & \stackrel{4}{b} \end{array}\right.`	$I = \left\lvert\, \begin{array}{ccc} 1 & a & 2 \\ & \downarrow & \downarrow \\ & \triangleright & 3 \\ & & \stackrel{4}{b} \end{array}\right.$	
fong-spivak-invitation_EQ0180 **[conf 0.013]**	273	■ 0.013 ● C|+7	`G=\left|\begin{array}{ccc} 1 & & 2 \\ & \underset{c}{a}^{\downarrow} e^{\downarrow} & \\ & & v_{3} \end{array}\right|`	$G = \left\lvert \begin{array}{ccc} 1 & & 2 \\ & \underset{c}{a}^{\downarrow} e^{\downarrow} & \\ & & v_{3} \end{array} \right\rvert$	
fong-spivak-invitation_EQ0135 **[conf 0.019]**	215	■ 0.019 ● C|+8	`\begin{aligned} \mu_{X} & :=\left(X+X \xrightarrow{\left[\mathrm{id}_{X}, \mathrm{id}_{X}\right]} X \stackrel{\mathrm{id}_{X}}{\longleftrightarrow} X\right) \\ \eta_{X} & :=\left(\varnothing \xrightarrow{!_{X}} X \underset{\mathrm{id}_{X}}{\longleftarrow} X\right) \\ \delta_{X} & :=\left(X \xrightarrow{\mathrm{id}_{X}} X \underset{\left.\mathrm{id}_{X}, \mathrm{id}_{X}\right]}{\longrightarrow} X+X\right) \\ \epsilon_{X} & :=\left(X \xrightarrow{\mathrm{id}_{X}} \varnothing\right) \end{aligned}`	$\begin{aligned} \mu_{X} & :=\left(X+X \xrightarrow{\left[\mathrm{id}_{X}, \mathrm{id}_{X}\right]} X \stackrel{\mathrm{id}_{X}}{\longleftrightarrow} X\right) \\ \eta_{X} & :=\left(\varnothing \xrightarrow{!_{X}} X \underset{\mathrm{id}_{X}}{\longleftarrow} X\right) \\ \delta_{X} & :=\left(X \xrightarrow{\mathrm{id}_{X}} X \underset{\left.\mathrm{id}_{X}, \mathrm{id}_{X}\right]}{\longrightarrow} X+X\right) \\ \epsilon_{X} & :=\left(X \xrightarrow{\mathrm{id}_{X}} \varnothing\right) \end{aligned}$	$\begin{aligned} \mu_{X} & :=\left(X+X \xrightarrow{\left[\mathrm{id}_{X}, \mathrm{id}_{X}\right]} X \xleftarrow{\mathrm{id}_{X}} X\right) \\ \eta_{X} & :=\left(\varnothing \xrightarrow{!_{X}} X \xleftarrow{\mathrm{id}_{X}} X\right) \\ \delta_{X} & :=\left(X \xrightarrow{\mathrm{id}_{X}} X \xleftarrow{\left[\mathrm{id}_{X}, \mathrm{id}_{X}\right]} X+X\right) \\ \epsilon_{X} & :=\left(X \xrightarrow{\mathrm{id}_{X}} X \xleftarrow{!_{X}} \varnothing\right) \end{aligned}$

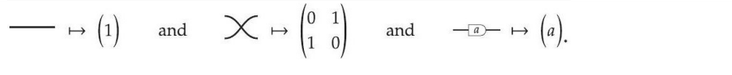
Conf. MathPix confidence: ■ ≥0.9 ■ 0.5–0.9 ■ <0.5 — no value
Residual render vs scan (inkdrill): ● C component ● W weak ● S stable ● N noise ● K clean ● not measured

Identifier	Page	Conf.	LaTeX source	Rendered	Scan image
fong-spivak-invitation_EQ0096 **[conf 0.022]**	146	■ 0.022 ● W|-2	`\operatorname{Col}(\Phi)=\begin{array}{|cc|} & \stackrel{5}{\longrightarrow} \\ 2 \downarrow & 3\left( \bigcup_{\dot{y}}^{x} 4\right. \\ \stackrel{\bullet}{ \dot{a}} & \\ \underset{\dot{y}}{a} & \end{array}`	$\operatorname{Col}(\Phi)=\begin{array}{\|cc\|} & \stackrel{5}{\longrightarrow} \\ 2 \downarrow & 3\left(\bigcup_{\dot{y}}^{x} 4\right. \\ \stackrel{\bullet}{ \dot{a}} & \\ \underset{\dot{y}}{a} & \end{array}$	$\operatorname{Col}(\Phi) =$ 
fong-spivak-invitation_EQ0199 **[conf 0.051]**	291	■ 0.051 ● S|+0	`A, \quad A \text { : } f, \quad A \text { : } g, \quad A \text { : } f \text { :h, } \quad A \text { : } g \text { : } i, \quad B, \quad B \text { :h, } \quad C, \quad C \text { : } i, \quad D`	$A, \quad A \text{ : } f, \quad A \text{ : } g, \quad A \text{ : } f \text{ :h, } \quad A \text{ : } g \text{ : } i, \quad B, \quad B \text{ :h, } \quad C, \quad C \text{ : } i, \quad D$	$A, \quad A \overset{\circ}{\S} f, \quad A \overset{\circ}{\S} g, \quad A \overset{\circ}{\S} f \overset{\circ}{\S} h, \quad A \overset{\circ}{\S} g \overset{\circ}{\S} i, \quad B, \quad B \overset{\circ}{\S} h, \quad C, \quad C \overset{\circ}{\S} i, \quad D$
fong-spivak-invitation_EQ0257 (A.2) **[conf 0.064]**	323	■ 0.064 ● S|-1	`\multimap \because N \xrightarrow{\mathrm{id}} X \stackrel{\text { [id,id] }}{\longleftarrow} X+X \xrightarrow{\text { [id,id] }} X \stackrel{\text { id }}{\longleftarrow} X`	$\multimap \because N \xrightarrow{\mathrm{id}} X \stackrel{\text { [id,id] }}{\longleftarrow} X+X \xrightarrow{\text { [id,id] }} X \stackrel{\text { id }}{\longleftarrow} X$	$= X \xrightarrow{\mathrm{id}} X \stackrel{\text { [id,id] }}{\longleftarrow} X+X \xrightarrow{\text { [id,id] }} X \stackrel{\text { id }}{\longleftarrow} X$
fong-spivak-invitation_EQ0187 **[conf 0.087]**	287	■ 0.087 ● C|-5	`\begin{aligned} (\mathcal{X} & \times \mathcal{Y})\left(\left(x_{1}, y_{1}\right),\left(x_{2}, y_{2}\right) \right) \otimes(\mathcal{X} \times \mathcal{Y})\left(\left(x_{2}, y_{2}\right),\left(x_{3}, y_{3}\right) \right) \\ & =\mathcal{X}\left(x_{1}, x_{2}\right) \otimes y\left(y_{1}, y_{2}\right) \otimes \mathcal{X} \left(x_{2}, x_{3}\right) \otimes y\left(y_{2}, y_{3} \right) \\ & =\mathcal{X}\left(x_{1}, x_{2}\right) \otimes \mathcal{X}\left(x_{2}, x_{3}\right) \otimes y \left(y_{1}, y_{2}\right) \otimes y \left(y_{2}, y_{3}\right) \\ & \leq \mathcal{X}\left(x_{1}, x_{3}\right) \otimes y \left(y_{1}, y_{3}\right) \\ & =(\mathcal{X} \times y)\left(\left(x_{1}, y_{1}\right),\left(x_{3}, y_{3}\right)\right) . \end{aligned}`	$\begin{aligned} (\mathcal{X} & \times \mathcal{Y})\left(\left(x_{1}, y_{1}\right),\left(x_{2}, y_{2}\right) \right) \otimes(\mathcal{X} \times \mathcal{Y})\left(\left(x_{2}, y_{2}\right),\left(x_{3}, y_{3}\right) \right) \\ & =\mathcal{X}\left(x_{1}, x_{2}\right) \otimes y\left(y_{1}, y_{2}\right) \otimes \mathcal{X} \left(x_{2}, x_{3}\right) \otimes y\left(y_{2}, y_{3} \right) \\ & =\mathcal{X}\left(x_{1}, x_{2}\right) \otimes \mathcal{X}\left(x_{2}, x_{3}\right) \otimes y \left(y_{1}, y_{2}\right) \otimes y \left(y_{2}, y_{3}\right) \\ & \leq \mathcal{X}\left(x_{1}, x_{3}\right) \otimes y \left(y_{1}, y_{3}\right) \\ & =(\mathcal{X} \times y)\left(\left(x_{1}, y_{1}\right),\left(x_{3}, y_{3}\right)\right) . \end{aligned}$	$\begin{aligned} & (\mathcal{X} \times \mathcal{Y})\big((x_1, y_1), (x_2, y_2)\big) \otimes (\mathcal{X} \times \mathcal{Y})\big((x_2, y_2), (x_3, y_3)\big) \\ & \quad = \mathcal{X}(x_1, x_2) \otimes \mathcal{Y}(y_1, y_2) \otimes \mathcal{X}(x_2, x_3) \otimes \mathcal{Y}(y_2, y_3) \\ & \quad = \mathcal{X}(x_1, x_2) \otimes \mathcal{X}(x_2, x_3) \otimes \mathcal{Y}(y_1, y_2) \otimes \mathcal{Y}(y_2, y_3) \\ & \quad \leq \mathcal{X}(x_1, x_3) \otimes \mathcal{Y}(y_1, y_3) \\ & \quad = (\mathcal{X} \times \mathcal{Y})\big((x_1, y_1), (x_3, y_3)\big). \end{aligned}$
fong-spivak-invitation_EQ0095	146	■ 0.151 ● C|+37	`\operatorname{Col}(\Phi)(a, b):= \begin{cases} \mathcal{X}(a, b) & \text { if } a, b \in \mathcal{X} \\ \Phi(a, b) & \text { if } a \in \mathcal{X}, b \in \mathcal{Y} \\ \varnothing & \text { if } a \in \mathcal{Y}, b \in \mathfrak{X} \\ y(a, b) & \text { if } a, b \in \mathcal{Y}\end{cases}`	$\operatorname{Col}(\Phi)(a, b):= \begin{cases} \mathcal{X}(a, b) & \text { if } a, b \in \mathcal{X} \\ \Phi(a, b) & \text { if } a \in \mathcal{X}, b \in \mathcal{Y} \\ \varnothing & \text { if } a \in \mathcal{Y}, b \in \mathfrak{X} \\ y(a, b) & \text { if } a, b \in \mathcal{Y}\end{cases}$	$\operatorname{Col}(\Phi)(a, b) := \begin{cases} \mathcal{X}(a, b) & \text{if } a, b \in \mathcal{X}, \\ \Phi(a, b) & \text{if } a \in \mathcal{X}, b \in \mathcal{Y}, \\ \varnothing & \text{if } a \in \mathcal{Y}, b \in \mathcal{X}, \\ \mathcal{Y}(a, b) & \text{if } a, b \in \mathcal{Y}. \end{cases}$
fong-spivak-invitation_EQ0085	138	■ 0.156 ● K|+0	`\text { Chassis: }(\text { load } \times \text { velocity })\rightarrow(\text { torque } \times \text { speed } \times \$) \text {. }`	$\text{Chassis: } (\text{ load } \times \text{ velocity }) \rightarrow (\text{ torque } \times \text{ speed } \times \$).$	$\text{Chassis: } \big(\text{load} \times \text{velocity}\big) \rightarrow\!\!\!\!\rightarrow \big(\text{torque} \times \text{speed} \times \$\big).$

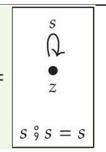
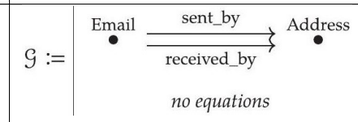
Conf. MathPix confidence: ■ ≥0.9 ■ 0.5–0.9 ■ <0.5 — no value
Residual render vs scan (inkdrill): ● C component ● W weak ● S stable ● N noise ● K clean ● not measured

Identifier	Page	Conf.	LaTeX source	Rendered	Scan image
fong-spivak-invitation_ EQ0201	291	■ 0.169 ● S|+1	`\mathcal{D}:=\left\lvert\, \begin{gathered} s \\ \stackrel{s}{\bullet} \\ z \\ s q s ; s ; s=s ; s \end{gathered}\right.`	$\mathcal{D} := \left\lvert \begin{gathered} s \\ \overset{s}{\bullet} \\ z \\ sqs; s; s = s; s \end{gathered} \right.$	$\mathcal{D} := \left\lvert \begin{gathered} s \\ \circlearrowleft \\ \bullet \\ z \\ s \fatsemi s \fatsemi s \fatsemi s = s \fatsemi s \end{gathered} \right.$
fong-spivak-invitation_ EQ0020 (2.3)	056	■ 0.184 ● C|+25	`\begin{array}{rlrl} h_{1}:=\{2 \oslash, 3 \oslash, 10 & , J \bullet, Q \bullet\}, & & i_{1}:=\{4 \bullet, 4 \bullet, 6 \circlearrowright, 6 \diamond, 10 \diamond\}, \\ h_{2}:=\{2 \diamond, 3 \diamond, 4 \diamond, K & , A \end{array},`	$\begin{array}{rlrl} h_{1} := \{2\oslash, 3\oslash, 10 & , J\bullet, Q\bullet\}, & & i_{1} := \{4\bullet, 4\bullet, 6\circlearrowright, 6\diamond, 10\diamond\}, \\ h_{2} := \{2\diamond, 3\diamond, 4\diamond, K & , A \end{array},$	$\begin{array}{rlrl} h_{1} := \{2\heartsuit, 3\heartsuit, 10\spadesuit, J\spadesuit, Q\spadesuit\}, & & i_{1} := \{4\clubsuit, 4\spadesuit, 6\heartsuit, 6\diamond, 10\diamond\}, \\ h_{2} := \{2\diamond, 3\diamond, 4\diamond, K\spadesuit, A\spadesuit\}, & & i_{2} := \{5\spadesuit, 5\heartsuit, 7\heartsuit, J\diamond, Q\diamond\}. \end{array}$
fong-spivak-invitation_ EQ0242	313	■ 0.193 ● C|+12	`a_{m}:=(1+\cdots+1+\precsim) ; \cdots ;(1+1+\precsim) ;`	$a_{m} := (1+\cdots+1+\precsim); \cdots ; (1+1+\precsim);$	$a_{m} := (1+\cdots+1+\succ\!-) \fatsemi \cdots \fatsemi (1+1+\succ\!-) \fatsemi (1+\succ\!-) \fatsemi \succ\!-: m \to 1.$
fong-spivak-invitation_ EQ0223	305	■ 0.204 ● N|-1	`\mathcal{X}(x, z)=\mathfrak{X}(x, z) \otimes I \leq \mathfrak{X}(x, z) \otimes \mathcal{X}(z, z) \leq \bigvee_{y \in \mathcal{X}} \mathcal{X}(x, y) \otimes \mathscr{X}(y, z),`	$\mathcal{X}(x, z) = \mathfrak{X}(x, z) \otimes I \leq \mathfrak{X}(x, z) \otimes \mathcal{X}(z, z) \leq \bigvee_{y \in \mathcal{X}} \mathcal{X}(x, y) \otimes \mathscr{X}(y, z),$	$\mathcal{X}(x, z) = \mathcal{X}(x, z) \otimes I \leq \mathcal{X}(x, z) \otimes \mathcal{X}(z, z) \leq \bigvee_{y \in \mathcal{X}} \mathcal{X}(x, y) \otimes \mathcal{X}(y, z),$
fong-spivak-invitation_ EQ0070	118	■ 0.219 ● C|+9	`C \underset{R}{\stackrel{L}{\Rightarrow}} D`	$C \underset{R}{\overset{L}{\Rightarrow}} D$	$\mathcal{C} \underset{R}{\overset{L}{\Rightarrow}} \mathcal{D}$
fong-spivak-invitation_ EQ0185	282	■ 0.226 ● C|-5	`\begin{array}{rlr} t+u & \leq(v+w)+u & (\text { monotonicity, } t \leq v+w, u \leq u) \\ & =v+(w+u) & (\text { associativity }) \\ & \leq v+(x+z) & (\text { monotonicity, } v \leq v, w+u \leq x+v) \\ & =(v+x)+z & (\text { associativity }) \\ & \leq y+z . & (\text { monotonicity, } v+x \leq y, z \leq z) \end{array}`	$\begin{array}{rlr} t+u & \leq(v+w)+u & (\text { monotonicity, } t \leq v+w, u \leq u) \\ & =v+(w+u) & (\text { associativity }) \\ & \leq v+(x+z) & (\text { monotonicity, } v \leq v, w+u \leq x+v) \\ & =(v+x)+z & (\text { associativity }) \\ & \leq y+z . & (\text { monotonicity, } v+x \leq y, z \leq z) \end{array}$	$\begin{array}{rlr} t+u & \leq(v+w)+u & (\text{monotonicity, } t \leq v+w, u \leq u) \\ & =v+(w+u) & (\text{associativity}) \\ & \leq v+(x+z) & (\text{monotonicity, } v \leq v, w+u \leq x+v) \\ & =(v+x)+z & (\text{associativity}) \\ & \leq y+z. & (\text{monotonicity, } v+x \leq y, z \leq z) \end{array}$
fong-spivak-invitation_ EQ0222	302	■ 0.229 ● W|+0	`\begin{aligned} ((\Phi ; \Psi) ; \Upsilon)(p, s) & =\bigvee_{r \in \mathcal{R}}\left(\bigvee_{q \in \mathbb{Q}} \Phi(p, q) \otimes \Psi(q, r)\right) \otimes \Upsilon(r, s) \\ & =\bigvee_{r \in \mathcal{R}, q \in \mathcal{Q}} \Phi(p, q) \otimes \Psi(q, r) \otimes \Upsilon(r, s) \\ & =\bigvee_{q \in \mathcal{Q}} \Phi(p, q) \otimes \bigvee_{r \in \mathcal{R}}(\Psi(q, r) \otimes \Upsilon(r, s)) \\ & =(\Phi ;(\Psi ; \Upsilon))(p, s) . \end{aligned}`	$\begin{aligned} ((\Phi ; \Psi) ; \Upsilon)(p, s) &= \bigvee_{r \in \mathcal{R}}\left(\bigvee_{q \in \mathbb{Q}} \Phi(p, q) \otimes \Psi(q, r)\right) \otimes \Upsilon(r, s) \\ &= \bigvee_{r \in \mathcal{R}, q \in \mathcal{Q}} \Phi(p, q) \otimes \Psi(q, r) \otimes \Upsilon(r, s) \\ &= \bigvee_{q \in \mathcal{Q}} \Phi(p, q) \otimes \bigvee_{r \in \mathcal{R}}(\Psi(q, r) \otimes \Upsilon(r, s)) \\ &= (\Phi ;(\Psi ; \Upsilon))(p, s). \end{aligned}$	$\begin{aligned} ((\Phi \fatsemi \Psi) \fatsemi \Upsilon)(p, s) &= \bigvee_{r \in \mathcal{R}}\left(\bigvee_{q \in \mathcal{Q}} \Phi(p, q) \otimes \Psi(q, r)\right) \otimes \Upsilon(r, s) \\ &= \bigvee_{r \in \mathcal{R}, q \in \mathcal{Q}} \Phi(p, q) \otimes \Psi(q, r) \otimes \Upsilon(r, s) \\ &= \bigvee_{q \in \mathcal{Q}} \Phi(p, q) \otimes \bigvee_{r \in \mathcal{R}}\left(\Psi(q, r) \otimes \Upsilon(r, s)\right) \\ &= (\Phi \fatsemi (\Psi \fatsemi \Upsilon))(p, s). \end{aligned}$

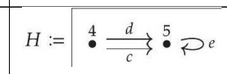
Conf. MathPix confidence: ■ ≥0.9 ■ 0.5–0.9 ■ <0.5 — no value
Residual render vs scan (inkdrill): ● C component ● W weak ● S stable ● N noise ● K clean ● not measured

Identifier	Page	Conf.	LaTeX source	Rendered	Scan image
fong-spivak-invitation_ EQ0134	213	■ 0.235 ● C|+91	`\begin{array}{rrrr} \operatorname{in}(\mu) & :=2, & \operatorname{in}(\eta):=0, & \operatorname{in}(\delta):=1, \end{array} \quad \operatorname{in}(\epsilon):=1,,`	$\operatorname{in}(\mu) \quad := 2, \quad \operatorname{in}(\eta) := 0, \quad \operatorname{in}(\delta) := 1, \quad \operatorname{in}(\epsilon) := 1,,$	$in(\mu) := 2, \quad in(\eta) := 0, \quad in(\delta) := 1, \quad in(\epsilon) := 1,$ $out(\mu) := 1, \quad out(\eta) := 1, \quad out(\delta) := 2, \quad out(\epsilon) := 0.$
fong-spivak-invitation_ EQ0116	180	■ 0.238 ● C|-3	`-\mapsto(1) \quad \text { and } \quad X \mapsto\left( \begin{array}{cc} 0 & 1 \\ 1 & 0 \end{array}\right) \quad \text { and } \quad-a-\mapsto(a) .`	$- \mapsto (1) \quad \text{and} \quad X \mapsto \begin{pmatrix} 0 & 1 \\ 1 & 0 \end{pmatrix} \quad \text{and} \quad -a- \mapsto (a).$	
fong-spivak-invitation_ EQ0023	058	■ 0.254 ● S|+0	`\left.\overline{3.14} \quad \overline{-1} \quad \frac{\frac{3.14}{-1}}{}\right\}=\frac{}{2.14} \quad \overline{0}=\text { nothing }`	$\left.\overline{3.14} \quad \overline{-1} \quad \frac{\frac{3.14}{-1}}{}\right\}=\frac{}{2.14} \quad \overline{0}= \text{ nothing }$	$\left.\overline{3.14} \quad \overline{-1} \quad \frac{\frac{3.14}{-1}}{}\right\}=\frac{}{2.14} \quad \overline{0}= \textit{nothing}$
fong-spivak-invitation_ EQ0227	306	■ 0.259 ● C|+43	`\begin{aligned} & \bigvee_{a, b, c, d, e \in \mathcal{X}} \alpha^{-1}(x,(a, 1)) \otimes\left(\mathrm{U}_{ \mathcal{X}} \times \eta_{\mathcal{X}}\right)((a, 1),(b, c, d)) \\ = & \bigvee_{a, b, c, d, e \in \mathcal{X}} \alpha^{-1}(x,(a, 1)) \otimes \mathrm{U}_{ \mathcal{X}}(a, b) \otimes \eta_{\mathcal{X}}(1, c, d)((b, c, d),(1, e)) \otimes \alpha((1, e), y) \\ = & \bigvee_{a, b, c, d, e \in \mathcal{X}} x(x, a) \otimes \epsilon_{\mathcal{X}}(b, c, 1) \otimes \mathrm{U}_{ \mathcal{X}}(d, e) \otimes \alpha((1, e), y) \\ = & x(x, y), \end{aligned}`	$\begin{aligned} & \bigvee_{a,b,c,d,e\in\mathcal{X}} \alpha^{-1}(x,(a,1)) \otimes (\mathrm{U}_{\mathcal{X}} \times \eta_{\mathcal{X}})((a,1),(b,c,d)) \\ = & \bigvee_{a,b,c,d,e\in\mathcal{X}} \alpha^{-1}(x,(a,1)) \otimes \mathrm{U}_{\mathcal{X}}(a,b) \otimes \eta_{\mathcal{X}}(1,c,d)((b,c,d),(1,e)) \otimes \alpha((1,e),y) \\ = & \bigvee_{a,b,c,d,e\in\mathcal{X}} x(x,a) \otimes \epsilon_{\mathcal{X}}(b,c,1) \otimes \mathrm{U}_{\mathcal{X}}(d,e) \otimes \alpha((1,e),y) \\ = & x(x,y), \end{aligned}$	$\begin{aligned} & \bigvee_{a,b,c,d,e\in\mathcal{X}} \alpha^{-1}(x,(a,1)) \otimes (\mathrm{U}_{\mathcal{X}} \times \eta_{\mathcal{X}})((a,1),(b,c,d)) \\ & \qquad \otimes (\epsilon_{\mathcal{X}} \times \mathrm{U}_{\mathcal{X}})((b,c,d),(1,e)) \otimes \alpha((1,e),y) \\ = & \bigvee_{a,b,c,d,e\in\mathcal{X}} \alpha^{-1}(x,(a,1)) \otimes \mathrm{U}_{\mathcal{X}}(a,b) \otimes \eta_{\mathcal{X}}(1,c,d) \\ & \qquad \otimes \epsilon_{\mathcal{X}}(b,c,1) \otimes \mathrm{U}_{\mathcal{X}}(d,e) \otimes \alpha((1,e),y) \\ = & \bigvee_{a,b,c,d,e\in\mathcal{X}} \mathcal{X}(x,a) \otimes \mathcal{X}(a,b) \otimes \mathcal{X}(c,d) \otimes \mathcal{X}(b,c) \otimes \mathcal{X}(d,e) \otimes \mathcal{X}(e,y) \\ = & \mathcal{X}(x,y), \end{aligned}$
fong-spivak-invitation_ EQ0040	078	■ 0.267 ● W|+1	`\begin{array}{rlr} \mathcal{C}_{f}(c, d) \otimes_{W} \mathcal{C}_{f}(d, e & =f(\mathcal{C}(c, d)) \otimes_{W} f(\mathcal{C}(d, e)) & \left(\text { definition of } \mathcal{C}_{f}\right) \\ & \leq f\left(\mathcal{C}(c, d) \otimes_{V} \mathcal{C}(d, e)\right) & (f \text { is monoidal monotone }) \\ & \leq f(\mathcal{C}(c, e)) & (\mathcal{C} \text { is } \mathcal{V}\text{-category }) \\ & =\mathcal{C}_{f}(c, e) & \left(\text { definition of } \mathcal{C}_{f}\right) \end{array}`	$\begin{array}{rlr} \mathcal{C}_{f}(c, d) \otimes_{W} \mathcal{C}_{f}(d, e & =f(\mathcal{C}(c, d)) \otimes_{W} f(\mathcal{C}(d, e)) & \left(\text { definition of } \mathcal{C}_{f}\right) \\ & \leq f\left(\mathcal{C}(c, d) \otimes_{V} \mathcal{C}(d, e)\right) & (f \text { is monoidal monotone }) \\ & \leq f(\mathcal{C}(c, e)) & (\mathcal{C} \text { is } \mathcal{V}\text{-category }) \\ & =\mathcal{C}_{f}(c, e) & \left(\text { definition of } \mathcal{C}_{f}\right) \end{array}$	$\begin{array}{rlr} \mathcal{C}_{f}(c, d) \otimes_{W} \mathcal{C}_{f}(d, e) = & f(\mathcal{C}(c, d)) \otimes_{W} f(\mathcal{C}(d, e)) & \left(\text { definition of } \mathcal{C}_{f}\right) \\ \leq & f\left(\mathcal{C}(c, d) \otimes_{V} \mathcal{C}(d, e)\right) & (f \text { is monoidal monotone }) \\ \leq & f(\mathcal{C}(c, e)) & (\mathcal{C} \text { is } \mathcal{V}\text{-category }) \\ = & \mathcal{C}_{f}(c, e) & \left(\text { definition of } \mathcal{C}_{f}\right). \end{array}$
fong-spivak-invitation_ EQ0256	320	■ 0.281 ● C|+4	`\left[\operatorname{id}_{A},!_{A}\right]{ }^{\circ} \iota_{A}=\left[\operatorname{id}_{A}{ }^{\circ} \iota_{A},!_{A}{ }^{\circ} \iota_{A}\right]=\left[ \iota_{A},!_{A+\varnothing}\right]=\left[\iota_{A}, \iota_{\varnothing}\right]=\operatorname{id}_{A+ \varnothing} .`	$\left[\operatorname{id}_{A},!_{A}\right]{}^{\circ}\iota_{A} = \left[\operatorname{id}_{A}{}^{\circ}\iota_{A},!_{A}{}^{\circ}\iota_{A}\right] = \left[\iota_{A},!_{A+\varnothing}\right] = \left[\iota_{A},\iota_{\varnothing}\right] = \operatorname{id}_{A+\varnothing}.$	$\left[\operatorname{id}_{A},!_{A}\right] \fatsemi \iota_{A} = \left[\operatorname{id}_{A} \fatsemi \iota_{A},!_{A} \fatsemi \iota_{A}\right] = \left[\iota_{A},!_{A+\varnothing}\right] = \left[\iota_{A},\iota_{\varnothing}\right] = \operatorname{id}_{A+\varnothing}.$

Conf. MathPix confidence: ■ ≥0.9 ■ 0.5–0.9 ■ <0.5 — no value
Residual render vs scan (inkdrill): ● C component ● W weak ● S stable ● N noise ● K clean ● not measured

Identifier	Page	Conf.	LaTeX source	Rendered	Scan image
fong-spivak-invitation_ EQ0043 (2.22)	080	■ 0.305 ● N|+0	`(\mathcal{X} \times \mathcal{Y})\left(\left(x_{1}, y_{1}\right),\left(x_{2}, y_{2}\right)\right) \otimes(\mathcal{X} \times \mathcal{Y})\left(\left(x_{2}, y_{2} \right),\left(x_{3}, y_{3}\right)\right) \leq(\mathcal{X} \times \mathcal{Y})\left(\left(x_{1}, y_{1}\right), \left(x_{3}, y_{3}\right)\right) .`	$(\mathcal{X} \times \mathcal{Y})\left(\left(x_{1}, y_{1}\right),\left(x_{2}, y_{2}\right)\right) \otimes(\mathcal{X} \times \mathcal{Y})\left(\left(x_{2}, y_{2}\right),\left(x_{3}, y_{3}\right)\right) \leq(\mathcal{X} \times \mathcal{Y})\left(\left(x_{1}, y_{1}\right), \left(x_{3}, y_{3}\right)\right) .$	$(\mathcal{X}\times\mathcal{Y})\big((x_1, y_1), (x_2, y_2)\big)\otimes(\mathcal{X}\times\mathcal{Y})\big((x_2, y_2), (x_3, y_3)\big) \leq (\mathcal{X}\times\mathcal{Y})\big((x_1, y_1), (x_3, y_3)\big).$
fong-spivak-invitation_ EQ0112 (5.6)	177	■ 0.315 ● C|+5	`G_{R}:=\{\bigcirc-, \circ-, \subset, \cdots\} \cup\{-a- \mid a \in R\},`	$G_R := \{\bigcirc-, \circ-, \subset, \cdots\} \cup \{-a- \mid a \in R\},$	$G_R := \{$ $\}$
fong-spivak-invitation_ EQ0059 (3.8)	108	■ 0.323 ● N|+0	`\mathcal{C}:=\begin{array}{|c|} \hline s \\ \mathcal{Q} \\ \ \bullet \\ z \\ s ; s=s \\ \hline \end{array}`	$\mathcal{C} := \begin{array}{\|c\|} \hline s \\ \mathcal{Q} \\ \bullet \\ z \\ s ; s=s \\ \hline \end{array}$	$\mathcal{C} :=$ 
fong-spivak-invitation_ EQ0118	184	■ 0.327 ● C|+10	`G_{R}:=\{\supset-, \circ-, \subset, \cdots\} \cup\{-\mathrm{a}-\mid \mathrm{a} \in R\},`	$G_R := \{\supset -, \circ-, \subset, \cdots\} \cup \{-\mathrm{a}- \mid \mathrm{a} \in R\},$	$G_R := \{$ $\}$
fong-spivak-invitation_ EQ0037	074	■ 0.341 ● N|+0	`X:=\operatorname{Ob}(\mathcal{X}), \quad d(x, y):= \mathcal{X}(x, y) .`	$X := \mathrm{Ob}(\mathcal{X}), \quad d(x, y) := \mathcal{X}(x, y).$	$X := \mathrm{Ob}(\mathcal{X}), \qquad d(x, y) := \mathcal{X}(x, y).$
fong-spivak-invitation_ EQ0260	332	■ 0.372 ● K|+0	`\bigcup_{i \in I} A_{i}=\bigcup_{i \in I}\left(B_{i} \cap Y\right)=\left(\bigcup_{i \in i} B_{i}\right) \cap Y \in \mathbf{\mathbf { 0 p } _ { ? \cap Y }} .`	$\bigcup_{i \in I} A_i = \bigcup_{i \in I} (B_i \cap Y) = \left(\bigcup_{i \in i} B_i\right) \cap Y \in \mathbf{Op}_{?\cap \mathbf{Y}}.$	$\bigcup_{i \in I} A_i = \bigcup_{i \in I} (B_i \cap Y) = \left(\bigcup_{i \in i} B_i\right) \cap Y \in \mathbf{Op}_{?\cap \mathbf{Y}}.$
fong-spivak-invitation_ EQ0075 (3.15)	121	■ 0.380 ● U|+40	`\mathcal{G}:=\mid \stackrel{\text { Email }}{\underset{ \text { received_by }}{\stackrel{\text { sent_by }}{ \longrightarrow}}} \text { Address }`	*(not rendered)*	$\mathcal{G} :=$ 
fong-spivak-invitation_ EQ0141	221	■ 0.382 ● W|+1	`\begin{aligned} \operatorname{Circ}(f): \operatorname{Circ}(V) & \longrightarrow \operatorname{Circ}\left(V^{\prime}\right) \\ (V, A, s, t, \ell) & \longmapsto\left(V^{\prime}, A,(s \div f),(t ; f), \ell\right) . \end{aligned}`	$\begin{aligned} \mathrm{Circ}(f): \mathrm{Circ}(V) & \longrightarrow \mathrm{Circ}\left(V^{\prime}\right) \\ (V, A, s, t, \ell) & \longmapsto\left(V^{\prime}, A,(s \div f),(t ; f), \ell\right) . \end{aligned}$	$\mathsf{Circ}(f): \mathsf{Circ}(V) \longrightarrow \mathsf{Circ}(V');$ $(V, A, s, t, \ell) \longmapsto \big(V', A, (s \fatsemi f), (t \fatsemi f), \ell\big).$
fong-spivak-invitation_ EQ0214	299	■ 0.401 ● W|-2	`\begin{aligned} \Lambda(\text { monoid }, \text { nothing }) & =\Lambda(\text { monoid, this book }) \\ & =\Lambda(\text { preorder, this book }) \\ \Lambda(\text { preorder, nothing }) & =\Lambda(\text { category, nothing })=\text { false. } \end{aligned} \quad=\Lambda(\text { category, this book })=\text { true }`	$\begin{aligned} \Lambda(\text{ monoid }, \text{ nothing }) &= \Lambda(\text{ monoid, this book }) \\ &= \Lambda(\text{ preorder, this book }) \\ \Lambda(\text{ preorder, nothing }) &= \Lambda(\text{ category, nothing }) = \text{ false.} \end{aligned} \quad = \Lambda(\text{ category, this book }) = \text{ true}$	$\begin{aligned} \Lambda(\text{monoid, nothing}) &= \Lambda(\text{monoid, this book}) \\ &= \Lambda(\text{preorder, this book}) \\ \Lambda(\text{preorder, nothing}) &= \Lambda(\text{category, nothing}) = \texttt{false}. \end{aligned} \quad = \Lambda(\text{category, this book}) = \texttt{true}$
fong-spivak-invitation_ EQ0024	059	■ 0.473 ● N|+2	`\left.\left.\frac{\frac{x}{y}}{z}\right\}=\frac{x \otimes y}{z}\right\}=\left\{\frac{x}{y \otimes z}= \left\{\frac{y}{z}\right.\right.`	$\left.\left.\frac{\frac{x}{y}}{z}\right\}=\frac{x \otimes y}{z}\right\}=\left\{\frac{x}{y \otimes z}=\left\{\frac{y}{z}\right.\right.$	$\left.\left.\frac{\frac{x}{y}}{z}\right\}=\frac{x \otimes y}{z}\right\}=\left\{\frac{x}{y \otimes z}=\left\{\frac{y}{z}\right.\right.$

Conf. MathPix confidence: ■ ≥0.9 ■ 0.5–0.9 ■ <0.5 — no value
Residual render vs scan (inkdrill): ● C component ● W weak ● S stable ● N noise ● K clean ● not measured

Identifier	Page	Conf.	LaTeX source	Rendered	Scan image
fong-spivak-invitation_ EQ0255	320	■ 0.480 ● N|+1	`\mathrm{id}_{A}+\mathrm{id}_{B}=\left[\mathrm{id}_{A}{ }^{\circ} \iota_{A}, \mathrm{id}_{B}{ }_{\circ}^{\circ} \iota_{B}\right]=\left[\iota_{A}, \iota_{B}\right]= \mathrm{id}_{A+B} .`	$\mathrm{id}_{A}+\mathrm{id}_{B}=\left[\mathrm{id}_{A}{}^{\circ} \iota_{A}, \mathrm{id}_{B}{}_{\circ}^{\circ} \iota_{B}\right]=\left[\iota_{A}, \iota_{B}\right]=\mathrm{id}_{A+B} .$	$\mathrm{id}_{A}+\mathrm{id}_{B}=[\mathrm{id}_{A} \fatsemi \iota_{A}, \mathrm{id}_{B} \fatsemi \iota_{B}]=[\iota_{A}, \iota_{B}]=\mathrm{id}_{A+B}$.
fong-spivak-invitation_ EQ0210	296	■ 0.483 ● W|-2	`H:=\stackrel{4}{\underset{c}{\leftrightarrows}} \stackrel{d}{\leftrightarrows} \stackrel{5}{ \rightleftarrows} \circlearrowright e`	$H:=\overset{4}{\underset{c}{\leftrightarrows}} \overset{d}{\leftrightarrows} \overset{5}{\rightleftarrows} \circlearrowright e$	$H:=$ 
fong-spivak-invitation_ EQ0186	284	■ 0.486 ● C|+6	`\begin{gathered} g(\text { false })+g(\text { false })= \infty+\infty \geq \infty=g(\text { false } \wedge \text { false }), \\ g(\text { false })+g(\text { true })= \infty+0 \geq \infty=g(\text { false } \wedge \text { true }), \\ g(\text { true })+g(\text { false })=0+\infty \geq \infty=g(\text { true } \wedge \text { false }), \\ g(\text { true })+g(\text { true })=0+0 \geq 0=g(\text { true } \wedge \text { true }) \end{gathered}`	$\begin{gathered} g(\text { false })+g(\text { false })=\infty+\infty \geq \infty=g(\text { false } \wedge \text { false }), \\ g(\text { false })+g(\text { true })=\infty+0 \geq \infty=g(\text { false } \wedge \text { true }), \\ g(\text { true })+g(\text { false })=0+\infty \geq \infty=g(\text { true } \wedge \text { false }), \\ g(\text { true })+g(\text { true })=0+0 \geq 0=g(\text { true } \wedge \text { true }) \end{gathered}$	$\begin{gathered} g(\mathtt{false})+g(\mathtt{false})=\infty+\infty \geq \infty=g(\mathtt{false} \wedge \mathtt{false}), \\ g(\mathtt{false})+g(\mathtt{true})=\infty+0 \geq \infty=g(\mathtt{false} \wedge \mathtt{true}), \\ g(\mathtt{true})+g(\mathtt{false})=0+\infty \geq \infty=g(\mathtt{true} \wedge \mathtt{false}), \\ g(\mathtt{true})+g(\mathtt{true})=0+0 \geq 0=g(\mathtt{true} \wedge \mathtt{true}). \end{gathered}$
fong-spivak-invitation_ EQ0092	143	■ 0.504 ● C|+3	`(\Phi ; \Psi) ; \Upsilon=\Phi ;(\Psi ; \Upsilon) .`	$(\Phi ; \Psi) ; \Upsilon=\Phi ;(\Psi ; \Upsilon)$.	$(\Phi \fatsemi \Psi) \fatsemi \Upsilon=\Phi \fatsemi(\Psi \fatsemi \Upsilon)$.
fong-spivak-invitation_ EQ0077	122	■ 0.507 ● U|-7	`\left.\frac{\mathbf{1}}{\text { Em_6 }} \right\rvert\,`	*(not rendered)*	$\left.\frac{\mathbf{1}}{\text { Em_6 }}\right\rvert$
fong-spivak-invitation_ EQ0071	118	■ 0.519 ● W|+2	`\text { Set } \underset{(-)^{B}}{\stackrel{-\times B}{\rightleftarrows}} \text { Set } \quad \operatorname{Set}(A \times B, C) \cong \operatorname{Set}\left(A, C^{B}\right) .`	$\text{Set} \underset{(-)^{B}}{\overset{-\times B}{\rightleftarrows}} \text{Set} \quad \operatorname{Set}(A \times B, C) \cong \operatorname{Set}\left(A, C^{B}\right)$.	$\mathbf{Set} \underset{(-)^{B}}{\overset{-\times B}{\rightleftarrows}} \mathbf{Set} \qquad \mathbf{Set}(A \times B, C) \cong \mathbf{Set}(A, C^{B})$.
fong-spivak-invitation_ EQ0206	293	■ 0.529 ● N|+0	`F(a):=a^{\prime}, \quad G(a):=a^{\prime}, \quad F(b):=b^{ \prime}, \quad G(b):=b^{\prime}, \quad F(f):=f_{1}, \quad \text { and } G(f):=f_{2} .`	$F(a):=a^{\prime}, \quad G(a):=a^{\prime}, \quad F(b):=b^{\prime}, \quad G(b):=b^{\prime}, \quad F(f):=f_{1}, \quad \text{and } G(f):=f_{2}$.	$F(a):=a^{\prime}, \quad G(a):=a^{\prime}, \quad F(b):=b^{\prime}, \quad G(b):=b^{\prime}, \quad F(f):=f_{1}, \text{ and } G(f):=f_{2}$.
fong-spivak-invitation_ EQ0074	121	■ 0.559 ● N|+0	`\Sigma_{!}: \mathcal{C}-\text { Inst } \rightarrow \text { Set } \quad \text { and } \quad \Pi_{!}: \mathcal{C}-\text { Inst } \rightarrow \text { Set. }`	$\Sigma_{!}: \mathcal{C}-\text{ Inst} \rightarrow \text{Set} \quad \text{and} \quad \Pi_{!}: \mathcal{C}-\text{ Inst} \rightarrow \text{Set}.$	$\Sigma_{!}: \mathcal{C}\text{-}\mathbf{Inst} \rightarrow \mathbf{Set} \quad \text{and} \quad \Pi_{!}: \mathcal{C}\text{-}\mathbf{Inst} \rightarrow \mathbf{Set}.$
fong-spivak-invitation_ EQ0239	313	■ 0.561 ● C|-4	`c_{n}:=-c:(1+-c):(1+1+-c): \ldots:(1+\cdots+1+<c): 1 \rightarrow n .`	$c_{n}:=-c:(1+-c):(1+1+-c):\ldots:(1+\cdots+1+<c): 1 \rightarrow n$.	$c_{n}:=-c \fatsemi(1+-c) \fatsemi(1+1+-c) \fatsemi \ldots \fatsemi(1+\cdots+1+-c): 1 \rightarrow n$.
fong-spivak-invitation_ EQ0073 (3.14)	121	■ 0.576 ● K|+0	`\text { !: C \rightarrow } \mathbf{1} .`	$!: \mathrm{C} \rightarrow \mathbf{1}$.	$!: \mathcal{C} \rightarrow \mathbf{1}$.
fong-spivak-invitation_ EQ0025	059	■ 0.583 ● W|+0	`\frac{\frac{x}{y}}{z} \quad=\quad \frac{\frac{x}{y}}{ \frac{z}{z}}`	$\frac{\frac{x}{y}}{z} \quad=\quad \frac{\frac{x}{y}}{\frac{z}{z}}$	$\frac{\frac{x}{y}}{z} \quad=\quad \frac{\frac{x}{y}}{z}$
fong-spivak-invitation_ EQ0132	206	■ 0.584 ● K|+0	`\left\{(v, d) \mid d \in D(v), \text { where } v=v_{1} \text { or } v=v_{2}\right\} .`	$\left\{(v, d) \mid d \in D(v), \text{ where } v=v_{1} \text{ or } v=v_{2}\right\}$.	$\{(v, d) \mid d \in D(v), \text{ where } v=v_{1} \text{ or } v=v_{2}\}$.
fong-spivak-invitation_ EQ0057	098	■ 0.592 ● N|+0	`\{A, B, C, D, f, g, h, i, f ; h\} .`	$\{A, B, C, D, f, g, h, i, f ; h\}$.	$\{A, B, C, D, f, g, h, i, f \fatsemi h\}$.
fong-spivak-invitation_ EQ0123 (5.14)	189	■ 0.602 ● K|+0	`\mathbf{S F G}_{R}^{+}:=\text {Free }\left(G_{R} \sqcup G_{R}^{\mathrm{op}}\right) .`	$\mathbf{SFG}_{R}^{+}:=\text{Free }\left(G_{R} \sqcup G_{R}^{\mathrm{op}}\right)$.	$\mathbf{SFG}_{R}^{+}:=\mathbf{Free}\left(G_{R} \sqcup G_{R}^{\mathrm{op}}\right)$.

Conf. MathPix confidence: ■ ≥0.9 ■ 0.5–0.9 ■ <0.5 — no value
Residual render vs scan (inkdrill): ● C component ● W weak ● S stable ● N noise ● K clean ● not measured

Identifier	Page	Conf.	LaTeX source	Rendered	Scan image
fong-spivak-invitation_ EQ0221	301	0.622 W|+0	`\begin{aligned} \Phi: \Psi & =\left(M_{X}^{3} * M_{ \Phi} * M_{Y}^{2}\right) *\left(M_{Y}^{2} * M_{\Psi} * M_{Z}^{3}\right) \\ & =M_{X}^{3} * M_{\Phi} * M_{Y}^{4} * M_{\Psi} * M_{Z}^{3} \\ & =\left(M_{X}^{3} * M_{\Phi} * M_{Y}^{2}\right) * M_{\Psi} * M_{Z}^{3} \\ & =\Phi * M_{\Psi} * M_{Z}^{3} \\ & =\left(\begin{array}{ccc} 17 & 20 & 20 \\ 11 & 14 & 14 \\ 14 & 17 & 17 \\ 12 & 9 & 15 \end{array}\right)\left(\begin{array}{cccc} \infty & \infty & \infty & \infty \\ \infty & \infty & 0 & \infty \\ 4 & \infty & \infty & 4 \end{array}\right) \left(\begin{array}{cccc} 0 & 2 & 4 & 5 \\ 4 & 0 & 2 & 3 \\ 2 & 4 & 0 & 1 \\ 1 & 3 & 5 & 0 \end{array}\right) \\ & =\left(\begin{array}{ccc} 17 & 20 & 20 \\ 11 & 14 & 14 \\ 14 & 17 & 17 \\ 12 & 9 & 15 \end{array}\right)\left(\begin{array}{cccc} \infty & \infty & \infty & \infty \\ 2 & 4 & 0 & 1 \\ 4 & 6 & 8 & 4 \end{array}\right) \\ & =\left(\begin{array}{cccc} 22 & 24 & 20 & 21 \\ 16 & 18 & 14 & 15 \\ 19 & 21 & 17 & 18 \\ 11 & 13 & 9 & 10 \end{array}\right) . \end{aligned}`	$\begin{aligned} \Phi: \Psi & =\left(M_{X}^{3} * M_{ \Phi} * M_{Y}^{2}\right) *\left(M_{Y}^{2} * M_{\Psi} * M_{Z}^{3}\right) \\ & =M_{X}^{3} * M_{\Phi} * M_{Y}^{4} * M_{\Psi} * M_{Z}^{3} \\ & =\left(M_{X}^{3} * M_{\Phi} * M_{Y}^{2}\right) * M_{\Psi} * M_{Z}^{3} \\ & =\Phi * M_{\Psi} * M_{Z}^{3} \\ & =\left(\begin{array}{ccc} 17 & 20 & 20 \\ 11 & 14 & 14 \\ 14 & 17 & 17 \\ 12 & 9 & 15 \end{array}\right)\left(\begin{array}{cccc} \infty & \infty & \infty & \infty \\ \infty & \infty & 0 & \infty \\ 4 & \infty & \infty & 4 \end{array}\right) \left(\begin{array}{cccc} 0 & 2 & 4 & 5 \\ 4 & 0 & 2 & 3 \\ 2 & 4 & 0 & 1 \\ 1 & 3 & 5 & 0 \end{array}\right) \\ & =\left(\begin{array}{ccc} 17 & 20 & 20 \\ 11 & 14 & 14 \\ 14 & 17 & 17 \\ 12 & 9 & 15 \end{array}\right)\left(\begin{array}{cccc} \infty & \infty & \infty & \infty \\ 2 & 4 & 0 & 1 \\ 4 & 6 & 8 & 4 \end{array}\right) \\ & =\left(\begin{array}{cccc} 22 & 24 & 20 & 21 \\ 16 & 18 & 14 & 15 \\ 19 & 21 & 17 & 18 \\ 11 & 13 & 9 & 10 \end{array}\right) . \end{aligned}$	$\begin{aligned} \Phi \fatsemi \Psi & =(M_X^3 * M_\Phi * M_Y^2) * (M_Y^2 * M_\Psi * M_Z^3) \\ & = M_X^3 * M_\Phi * M_Y^4 * M_\Psi * M_Z^3 \\ & = (M_X^3 * M_\Phi * M_Y^2) * M_\Psi * M_Z^3 \\ & = \Phi * M_\Psi * M_Z^3 \\ & = \begin{pmatrix} 17 & 20 & 20 \\ 11 & 14 & 14 \\ 14 & 17 & 17 \\ 12 & 9 & 15 \end{pmatrix} \begin{pmatrix} \infty & \infty & \infty & \infty \\ \infty & \infty & 0 & \infty \\ 4 & \infty & \infty & 4 \end{pmatrix} \begin{pmatrix} 0 & 2 & 4 & 5 \\ 4 & 0 & 2 & 3 \\ 2 & 4 & 0 & 1 \\ 1 & 3 & 5 & 0 \end{pmatrix} \\ & = \begin{pmatrix} 17 & 20 & 20 \\ 11 & 14 & 14 \\ 14 & 17 & 17 \\ 12 & 9 & 15 \end{pmatrix} \begin{pmatrix} \infty & \infty & \infty & \infty \\ 2 & 4 & 0 & 1 \\ 4 & 6 & 8 & 4 \end{pmatrix} \\ & = \begin{pmatrix} 22 & 24 & 20 & 21 \\ 16 & 18 & 14 & 15 \\ 19 & 21 & 17 & 18 \\ 11 & 13 & 9 & 10 \end{pmatrix} . \end{aligned}$
fong-spivak-invitation_ EQ0010 (1.7)	044	0.623 C|+21	`p \leq g(f(p)) \quad \text { and } \quad f(g(q)) \leq q .`	$p \leq g(f(p)) \quad \text{ and } \quad f(g(q)) \leq q .$	$p \leq g(f(p)) \quad \text{ and } \quad f(g(q)) \leq q .$
fong-spivak-invitation_ EQ0155 (7.7)	242	0.623 N|+2	`X=\{(\text { true }, \text { true }),(\text { true }, \text { false }),(\text { false }, \text { true })\} \subseteq \mathbb{B} \times \mathbb{B} .`	$X=\{(\text{ true }, \text{ true }),(\text{ true }, \text{ false }),(\text{ false }, \text{ true })\} \subseteq \mathbb{B} \times \mathbb{B} .$	$X=\{(\mathtt{true}, \mathtt{true}),(\mathtt{true}, \mathtt{false}),(\mathtt{false}, \mathtt{true})\} \subseteq \mathbb{B} \times \mathbb{B} .$
fong-spivak-invitation_ EQ0156	247	0.628 N|+1	`B(p ; \epsilon):=\left\{p^{\prime} \in \mathbb{R}^{2} \mid d\left(p, p^{\prime}\right)<\epsilon\right\} .^{7}`	$B(p ; \epsilon):=\left\{p^{\prime} \in \mathbb{R}^{2} \mid d\left(p, p^{\prime}\right)<\epsilon\right\} .^{7}$	$B(p ; \epsilon):=\{p^{\prime} \in \mathbb{R}^{2} \mid d(p, p^{\prime})<\epsilon\} .^{7}$
fong-spivak-invitation_ EQ0124	190	0.641 N|+2	`\mathrm{B}\left(g \circ\left(h^{\mathrm{op}}\right) \right)=\{(x, y) \mid S(g)(x)=S(h)(y)\} .`	$\mathrm{B}\left(g \circ\left(h^{\mathrm{op}}\right) \right)=\{(x, y) \mid S(g)(x)=S(h)(y)\} .$	$\mathrm{B}(g \fatsemi (h^{\mathrm{op}}))=\{(x, y) \mid S(g)(x)=S(h)(y)\} .$
fong-spivak-invitation_ EQ0080 (4.2)	134	0.641 C|+11	`\Phi: X^{\mathrm{op}} \times y \rightarrow \text { Bool. }`	$\Phi: X^{\mathrm{op}} \times y \rightarrow \text{ Bool.}$	$\Phi: \mathcal{X}^{\mathrm{op}} \times \mathcal{Y} \rightarrow \textbf{Bool}.$
fong-spivak-invitation_ EQ0097	150	0.644 C|+3	`\begin{aligned} S \times(T \times U) & :=\{(s,(t, u)) \mid s \in S, t \in T, u \in U\} \\ =? & (S \times T) \times U:=\{((s, t), u) \mid s \in S, t \in T, u \in U\} . \end{aligned}`	$\begin{aligned} S \times(T \times U) & :=\{(s,(t, u)) \mid s \in S, t \in T, u \in U\} \\ =? & (S \times T) \times U:=\{((s, t), u) \mid s \in S, t \in T, u \in U\} . \end{aligned}$	$\begin{aligned} S \times(T \times U) & :=\left\{(s,(t, u)) \mid s \in S, t \in T, u \in U\right\} \\ =? & (S \times T) \times U:=\left\{((s, t), u) \mid s \in S, t \in T, u \in U\right\} . \end{aligned}$

Conf. MathPix confidence: ≥0.9 0.5–0.9 <0.5 — no value
Residual render vs scan (inkdrill): C component W weak S stable N noise K clean not measured

Identifier	Page	Conf.	LaTeX source	Rendered	Scan image
fong-spivak-invitation_ EQ0224	305	■ 0.649 ● N|-1	`\bigvee_{y \in \mathcal{X}} \mathcal{X}(x, y) \otimes \mathcal{X}(y, z) \leq \bigvee_{y \in \mathcal{X}} \mathcal{X}(x, z)=\mathcal{X}(x, z) .`	$\bigvee_{y\in\mathcal{X}} \mathcal{X}(x,y)\otimes\mathcal{X}(y,z) \leq \bigvee_{y\in\mathcal{X}} \mathcal{X}(x,z)=\mathcal{X}(x,z).$	$\bigvee_{y\in\mathcal{X}} \mathcal{X}(x,y)\otimes\mathcal{X}(y,z) \leq \bigvee_{y\in\mathcal{X}} \mathcal{X}(x,z)=\mathcal{X}(x,z).$
fong-spivak-invitation_ EQ0055 (3.5)	096	■ 0.649 ● W|+1	`\mathbf{2}:=\operatorname{Free}\left(\begin{array}{|ccc|} \hline v_{1} & f_{1} & v_{2} \\ \bullet & & \bullet \\ \hline \end{array}\right)`	$\mathbf{2} := \operatorname{Free}\left(\begin{array}{\|ccc\|} \hline v_{1} & f_{1} & v_{2} \\ \bullet & & \bullet \\ \hline \end{array}\right)$	$\mathbf{2} := \operatorname{Free}\left(\begin{array}{\|ccc\|} \hline v_{1} & f_{1} & v_{2} \\ \bullet & \longrightarrow & \bullet \\ \hline \end{array}\right)$
fong-spivak-invitation_ EQ0107 (5.4)	167	■ 0.670 ● N|+0	`G+G^{\prime}:=\left(\left(V \sqcup V^{\prime}\right),[ \text { in }, \text { in' }],[\text { out }, \text { out' }],\left(\iota \sqcup \iota^{\prime}\right)\right) .`	$G+G^{\prime} := \left(\left(V \sqcup V^{\prime}\right),[\text{ in }, \text{ in' }],[\text{ out }, \text{ out' }],\left(\iota \sqcup \iota^{\prime}\right)\right).$	$G+G^{\prime} := \left(\left(V \sqcup V^{\prime}\right),[in, in'],[out, out'],\left(\iota \sqcup \iota^{\prime}\right)\right).$
fong-spivak-invitation_ EQ0151 (7.3)	239	■ 0.683 ● N|+0	`\mathcal{C}(A \times C, D) \cong \mathcal{C}\left(A, D^{C}\right) .`	$\mathcal{C}(A \times C, D) \cong \mathcal{C}\left(A, D^{C}\right).$	$\mathcal{C}(A \times C, D) \cong \mathcal{C}\left(A, D^{C}\right).$
fong-spivak-invitation_ EQ0191	288	■ 0.683 ● N|+0	`0 \otimes v \cong v \otimes 0 \cong\left(v \otimes \bigvee_{a \in \varnothing} a\right)=\bigvee_{a \in \varnothing}(v \otimes a)=0 .`	$0 \otimes v \cong v \otimes 0 \cong\left(v \otimes \bigvee_{a \in \varnothing} a\right)=\bigvee_{a \in \varnothing}(v \otimes a)=0.$	$0 \otimes v \cong v \otimes 0 \cong\left(v \otimes \bigvee_{a \in \varnothing} a\right)=\bigvee_{a \in \varnothing}(v \otimes a)=0.$
fong-spivak-invitation_ EQ0200	291	■ 0.687 ● S|+0	`A, \quad A: f, \quad A: g, \quad A: j, \quad B, \quad B: h, \quad C, \quad C: i, \quad D`	$A, \quad A: f, \quad A: g, \quad A: j, \quad B, \quad B: h, \quad C, \quad C: i, \quad D$	$A, \quad A: f, \quad A: g, \quad A: j, \quad B, \quad B: h, \quad C, \quad C: i, \quad D$
fong-spivak-invitation_ EQ0089	142	■ 0.688 ● C|+7	`\mathrm{U}_{\mathcal{P}} ; \Phi=\Phi=\Phi ; \mathrm{U}_{ \mathrm{Q}} .`	$\mathrm{U}_{\mathcal{P}} ; \Phi=\Phi=\Phi ; \mathrm{U}_{\mathrm{Q}}.$	$\mathrm{U}_{\mathcal{P}} ; \Phi=\Phi=\Phi ; \mathrm{U}_{\mathrm{Q}}.$
fong-spivak-invitation_ EQ0170 (7.18)	263	■ 0.706 ● K|+0	`\forall(t: T) . \exists(s: S) . f(s)=t`	$\forall(t: T) . \exists(s: S) . f(s)=t$	$\forall(t: T) . \exists(s: S) . f(s)=t$
fong-spivak-invitation_ EQ0061 (3.10)	113	■ 0.708 ● C|+13	`\mathbf{G r}:=\mid \stackrel{\text { Arrow }}{\underset{ \text { target }}{\text { source }}} \stackrel{\text { Vertex }}{\bullet}`	$\mathbf{Gr} :=\mid \stackrel{\text{Arrow}}{\underset{\text{target}}{\text{source}}} \stackrel{\text{Vertex}}{\bullet}$	$\mathbf{Gr} := \left\| \begin{array}{ccc} \text{Arrow} & \underset{\text{target}}{\overset{\text{source}}{\rightrightarrows}} & \text{Vertex} \\ \bullet & & \bullet \end{array} \right.$ *no equations*
fong-spivak-invitation_ EQ0018	049	■ 0.726 ● N|-1	`\text { fix }_{j}:=\{p \in P \mid j(p) \cong p\} .`	$\text{fix}_{j} := \{p \in P \mid j(p) \cong p\}.$	$\text{fix}_{j} := \{p \in P \mid j(p) \cong p\}.$
fong-spivak-invitation_ EQ0149 (7.2)	234	■ 0.727 ● K|+0	`((A=\mathrm{go}) \Rightarrow \ddot{S}>1) \wedge((A=\text { stop }) \Rightarrow \ddot{S}=0) .`	$((A=\mathrm{go}) \Rightarrow \ddot{S}>1) \wedge((A=\text{ stop }) \Rightarrow \ddot{S}=0).$	$((A=\mathrm{go}) \Rightarrow \ddot{S}>1) \wedge((A=\mathrm{stop}) \Rightarrow \ddot{S}=0).$
fong-spivak-invitation_ EQ0082	135	■ 0.730 ● C|+8	`\Phi: x^{\mathrm{op}} \times y \rightarrow \mathcal{V} .`	$\Phi: x^{\mathrm{op}} \times y \rightarrow \mathcal{V}.$	$\Phi: \mathcal{X}^{\mathrm{op}} \times \mathcal{Y} \rightarrow \mathcal{V}.$
fong-spivak-invitation_ EQ0248	316	■ 0.734 ● N|+0	`\mathrm{B}\left(g{ }_{9}^{\circ}\left(h^{\mathrm{op}} \right)\right)=\{(x, y) \mid S(g)(x)=S(h)(y)\} .`	$\mathrm{B}\left(g \fatsemi\left(h^{\mathrm{op}}\right)\right)=\{(x, y) \mid S(g)(x)=S(h)(y)\}.$	$\mathrm{B}\left(g \fatsemi\left(h^{\mathrm{op}}\right)\right)=\{(x, y) \mid S(g)(x)=S(h)(y)\}.$
fong-spivak-invitation_ EQ0114	178	■ 0.740 ● N|+2	`\left(\begin{array}{ll} A & 0 \\ 0 & B \end{array}\right)`	$\left(\begin{array}{ll} A & 0 \\ 0 & B \end{array}\right)$	$\left(\begin{array}{ll} A & 0 \\ 0 & B \end{array}\right)$
fong-spivak-invitation_ EQ0138	220	■ 0.748 ● N|+1	`C:-\{\text { light, switch, battery }\} \sqcup\left\{x \Omega \mid x \in \mathbb{R}^{+}\right\} .`	$C:-\{\text{ light, switch, battery }\} \sqcup\left\{x \Omega \mid x \in \mathbb{R}^{+}\right\}.$	$C:-\{\mathrm{light}, \mathrm{switch}, \mathrm{battery}\} \sqcup\left\{x \Omega \mid x \in \mathbb{R}^{+}\right\}.$
fong-spivak-invitation_ EQ0143 (6.21)	226	■ 0.754 ● C|+20	`\begin{aligned} \circ_{i}: \mathcal{O} & \left(s_{1}, \ldots, s_{m} ; t_{i}\right) \times \mathcal{O}\left(t_{1}, \ldots, t_{n} ; t\right) \\ & \rightarrow \mathcal{O}\left(t_{1}, \ldots, t_{i-1}, s_{1}, \ldots, s_{m}, t_{i+1}, \ldots, t_{n} ; t\right) ; \end{aligned}`	$\begin{aligned} \circ_{i}: \mathcal{O} & \left(s_{1}, \ldots, s_{m} ; t_{i}\right) \times \mathcal{O}\left(t_{1}, \ldots, t_{n} ; t\right) \\ & \rightarrow \mathcal{O}\left(t_{1}, \ldots, t_{i-1}, s_{1}, \ldots, s_{m}, t_{i+1}, \ldots, t_{n} ; t\right) ; \end{aligned}$	$\begin{aligned} \circ_{i}: \mathcal{O} & \left(s_{1}, \ldots, s_{m} ; t_{i}\right) \times \mathcal{O}\left(t_{1}, \ldots, t_{n} ; t\right) \\ & \rightarrow \mathcal{O}\left(t_{1}, \ldots, t_{i-1}, s_{1}, \ldots, s_{m}, t_{i+1}, \ldots, t_{n} ; t\right) ; \end{aligned}$

Conf. MathPix confidence: ■ ≥0.9 ■ 0.5–0.9 ■ <0.5 — no value
Residual render vs scan (inkdrill): ● C component ● W weak ● S stable ● N noise ● K clean ● not measured

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fong-spivak-invitation_ EQ0198	290	0.762 N|+0	`\stackrel{v_{1}}{\bullet} \xrightarrow{f_{1}} \stackrel{v_{2}}{\bullet} \xrightarrow{f_{2}} \cdots \xrightarrow{f_{n-1}} \stackrel{v_{n}}{\bullet}`	$\overset{v_1}{\bullet} \xrightarrow{f_1} \overset{v_2}{\bullet} \xrightarrow{f_2} \cdots \xrightarrow{f_{n-1}} \overset{v_n}{\bullet}$	$\overset{v_1}{\bullet} \xrightarrow{f_1} \overset{v_2}{\bullet} \xrightarrow{f_2} \cdots \xrightarrow{f_{n-1}} \overset{v_n}{\bullet}$
fong-spivak-invitation_ EQ0209	296	0.772 C|+3	`G:=\stackrel{1}{\bullet} \xrightarrow{a} \stackrel{2}{\bullet} \xrightarrow{b}`	$G := \overset{1}{\bullet} \xrightarrow{a} \overset{2}{\bullet} \xrightarrow{b}$	$G := \overset{1}{\bullet} \xrightarrow{a} \overset{2}{\bullet} \xrightarrow{b} \overset{3}{\bullet}$
fong-spivak-invitation_ EQ0160	253	0.775 S|+2	`\operatorname{Sec}_{f}(U):=\{g: U \rightarrow X \mid g \text { is continuous and }(g: f)(u)=u \text { for all } u \in U\} .`	$\operatorname{Sec}_f(U) := \{g : U \to X \mid g \text{ is continuous and } (g : f)(u) = u \text{ for all } u \in U\}.$	$\operatorname{Sec}_f(U) := \{g : U \to X \mid g \text{ is continuous and } (g \mathbin{;} f)(u) = u \text{ for all } u \in U\}.$
fong-spivak-invitation_ EQ0217	300	0.776 N|-1	`\mathcal{X}\left(x^{\prime}, x\right) \otimes \Phi(x, y) \otimes y\left(y, y^{\prime}\right) \leq \Phi\left(x^{ \prime}, y^{\prime}\right) .`	$\mathcal{X}\left(x^{\prime}, x\right) \otimes \Phi(x, y) \otimes y\left(y, y^{\prime}\right) \leq \Phi\left(x^{ \prime}, y^{\prime}\right) .$	$\mathcal{X}\left(x^{\prime}, x\right) \otimes \Phi(x, y) \otimes \mathcal{Y}\left(y, y^{\prime}\right) \leq \Phi\left(x^{ \prime}, y^{\prime}\right) .$
fong-spivak-invitation_ EQ0022 (nothing)	057	0.778 N|+0	`\bar{I}`	$\bar{I}$	$\bar{I}$
fong-spivak-invitation_ EQ0128	198	0.782 N|+2	`\mathcal{C}:=\stackrel{A}{\bullet} \stackrel{f}{g} \stackrel{B}{\bullet}`	$\mathcal{C} := \overset{A}{\bullet} \overset{f}{\underset{g}{\rightrightarrows}} \overset{B}{\bullet}$	$\mathcal{C} := \overset{A}{\bullet} \overset{f}{\underset{g}{\rightrightarrows}} \overset{B}{\bullet}$
fong-spivak-invitation_ EQ0148	231	0.787 N|+2	`\operatorname{Circ}(\varphi): \operatorname{Circ}(2) \times \operatorname{Circ}(2) \times \operatorname{Circ}(2) \rightarrow \operatorname{Circ}(0) .`	$\operatorname{Circ}(\varphi) : \operatorname{Circ}(2) \times \operatorname{Circ}(2) \times \operatorname{Circ}(2) \to \operatorname{Circ}(0).$	$\operatorname{Circ}(\varphi) : \operatorname{Circ}(2) \times \operatorname{Circ}(2) \times \operatorname{Circ}(2) \to \operatorname{Circ}(0).$
fong-spivak-invitation_ EQ0003	026	0.790 C|+5	`S:=\begin{array}{|lll} 11 & 12 & 13 \\ \bullet & \bullet & \bullet \\ 21 & 22 & 23 \\ \bullet & \bullet & \bullet \end{array}`	$S := \begin{array}{\|lll} 11 & 12 & 13 \\ \bullet & \bullet & \\ 21 & 22 & 23 \\ \bullet & \bullet & \bullet \end{array}$	$S := \begin{array}{\|lll} 11 & 12 & 13 \\ \bullet & \bullet & \bullet \\ 21 & 22 & 23 \\ \bullet & \bullet & \bullet \end{array}$
fong-spivak-invitation_ EQ0066	114	0.798 W|-1	`\begin{aligned} & G:= \\ & \begin{array}{c|cc} \text { Arrow } & \text { source } & \text { target } \\ \hline a & 1 & 2 \\ b & 2 & 3 \end{array} \\ & H:= \begin{array}{c|cc} \text { Arrow } & \text { source } & \text { target } \\ \hline c & 4 & 5 \\ d & 4 & 5 \\ e & 5 & 5 \end{array} \\ & \begin{array}{c} \text { Vertex } \\ \hline 4 \\ 5 \end{array} \end{aligned}`	$G :=$ Arrow | source target a | 1 2 b | 2 3 $H :=$ Arrow | source target c | 4 5 d | 4 5 e | 5 5 Vertex 4 5	$G :=$ Arrow | source target a | 1 2 b | 2 3 $H :=$ Arrow | source target c | 4 5 d | 4 5 e | 5 5 Vertex 4 5
fong-spivak-invitation_ EQ0159 (7.10)	251	0.806 N|+0	`\operatorname{Sec}_{f}(U):=\{s: U \rightarrow X \mid(s \circ f)(u)=u \text { for all } u \in U\} .`	$\operatorname{Sec}_f(U) := \{s : U \to X \mid (s \circ f)(u) = u \text{ for all } u \in U\}.$	$\operatorname{Sec}_f(U) := \{s : U \to X \mid (s \mathbin{;} f)(u) = u \text{ for all } u \in U\}.$
fong-spivak-invitation_ EQ0139	221	0.813 N|+0	`\text { Circ: }(\text { FinSet },+) \longrightarrow(\text { Set }, \times)`	$\text{Circ}: (\text{FinSet}, +) \longrightarrow (\text{Set}, \times)$	$\text{Circ}: (\textbf{FinSet}, +) \longrightarrow (\textbf{Set}, \times)$
fong-spivak-invitation_ EQ0225	305	0.820 C|-4	`\left(\alpha^{-1} ; \alpha\right)(x, z)=\bigvee_{(y, 1) \in \mathcal{X} \times \mathbf{1}} \alpha(x,(y, 1)) \otimes \alpha^{-1}((y, 1), z)=\bigvee_{y \in \mathcal{X}} \mathcal{X}(x, y) \otimes \mathcal{X}(y, z)=\mathcal{X}(x, z) .`	$(\alpha^{-1} ; \alpha)(x, z) = \bigvee_{(y,1) \in \mathcal{X} \times \mathbf{1}} \alpha(x,(y,1)) \otimes \alpha^{-1}((y,1),z) = \bigvee_{y \in \mathcal{X}} \mathcal{X}(x,y) \otimes \mathcal{X}(y,z) = \mathcal{X}(x,z).$	$(\alpha^{-1} \mathbin{;} \alpha)(x, z) = \bigvee_{(y,1) \in \mathcal{X} \times \mathbf{1}} \alpha(x,(y,1)) \otimes \alpha^{-1}((y,1),z) = \bigvee_{y \in \mathcal{X}} \mathcal{X}(x,y) \otimes \mathcal{X}(y,z) = \mathcal{X}(x,z).$

Conf. MathPix confidence: ■ ≥0.9 ■ 0.5–0.9 ■ <0.5 — no value
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fong-spivak-invitation_ EQ0100	157	0.831 N|+0	`\alpha: \beta:=\iota_{A \sqcup C}^{*}\left(\left(\iota_{A \sqcup B}\right)_{!}(\alpha) \vee\left(\iota_{B \sqcup C} \right)!(\beta)\right) .`	$\alpha : \beta := \iota^*_{A \sqcup C}\left(\left(\iota_{A \sqcup B}\right)_!(\alpha) \vee \left(\iota_{B \sqcup C}\right)!(\beta)\right).$	$\alpha \fatsemi \beta := \iota^*_{A \sqcup C}((\iota_{A \sqcup B})_!(\alpha) \vee (\iota_{B \sqcup C})_!(\beta)).$
fong-spivak-invitation_ EQ0083	135	0.833 N|+0	`\mathcal{X}\left(x^{\prime}, x\right) \otimes \Phi(x, y) \otimes y\left(y, y^{\prime}\right) \leq \Phi\left(x^{ \prime}, y^{\prime}\right) .`	$\mathcal{X}\left(x^{\prime}, x\right) \otimes \Phi(x, y) \otimes y\left(y, y^{\prime}\right) \leq \Phi\left(x^{\prime}, y^{\prime}\right).$	$\mathcal{X}(x', x) \otimes \Phi(x, y) \otimes \mathcal{Y}(y, y') \leq \Phi(x', y').$
fong-spivak-invitation_ EQ0021	057	0.839 W|-2	`\frac{\bar{x}}{\frac{y}{y}} \quad \overline{x \otimes y}`	$\frac{\bar{x}}{\frac{y}{y}} \quad \overline{x \otimes y}$	$\frac{\frac{x}{}}{y} \qquad \overline{x \otimes y}$
fong-spivak-invitation_ EQ0150	236	0.840 U|+8	`\{p \in P \mid \text { likes_cats }(p)\} .`	*(not rendered)*	$\{p \in P \mid \texttt{likes_cats}(p)\}.$
fong-spivak-invitation_ EQ0047	083	0.847 K|+0	`2 \mathrm{H}_{2} \mathrm{O} \rightarrow\left(2 \mathrm{Na} \multimap\left(2 \mathrm{NaOH}+\mathrm{H}_{2} \right)\right) .`	$2\mathrm{H}_2\mathrm{O} \rightarrow \left(2\mathrm{Na} \multimap \left(2\mathrm{NaOH} + \mathrm{H}_2\right)\right).$	$2\mathrm{H}_2\mathrm{O} \rightarrow (2\mathrm{Na} \multimap (2\mathrm{NaOH} + \mathrm{H}_2)).$
fong-spivak-invitation_ EQ0088 (4.8)	142	0.851 N|+0	`\mathrm{U}_{\mathcal{X}}(x, y):=\mathfrak{X}(x, y) .`	$\mathrm{U}_{\mathcal{X}}(x, y) := \mathfrak{X}(x, y).$	$\mathrm{U}_{\mathcal{X}}(x, y) := \mathcal{X}(x, y).$
fong-spivak-invitation_ EQ0090 (4.9)	142	0.868 W|+1	`\begin{aligned} \Phi(p, q) & =I \otimes \Phi(p, q) \leq \mathcal{P}(p, p) \otimes \Phi(p, q) \\ & \leq \bigvee_{p_{1} \in P}\left(\mathcal{P}\left(p, p_{1} \right) \otimes \Phi\left(p_{1}, q\right)\right)= \left(\mathrm{U}_{\mathcal{P}} ; \Phi\right)(p, q) . \end{aligned}`	$\begin{aligned} \Phi(p, q) & =I \otimes \Phi(p, q) \leq \mathcal{P}(p, p) \otimes \Phi(p, q) \\ & \leq \bigvee_{p_{1} \in P}\left(\mathcal{P}\left(p, p_{1} \right) \otimes \Phi\left(p_{1}, q\right)\right)= \left(\mathrm{U}_{\mathcal{P}} ; \Phi\right)(p, q). \end{aligned}$	$\begin{aligned} \Phi(p, q) & = I \otimes \Phi(p, q) \leq \mathcal{P}(p, p) \otimes \Phi(p, q) \\ & \leq \bigvee_{p_1 \in P}\left(\mathcal{P}(p, p_1) \otimes \Phi(p_1, q)\right) = (\mathrm{U}_{\mathcal{P}} \fatsemi \Phi)(p, q). \end{aligned}$
fong-spivak-invitation_ EQ0099	152	0.880 N|+0	`(f \times g) ;\left(f^{\prime} \times g^{\prime} \right)=(f ; g) \times\left(f^{\prime} ; g^{\prime} \right) .`	$(f \times g) ; \left(f^{\prime} \times g^{\prime}\right)=(f ; g) \times\left(f^{\prime} ; g^{\prime}\right) .$	$(f \times g) \fatsemi (f' \times g') = (f \fatsemi g) \times (f' \fatsemi g').$
fong-spivak-invitation_ EQ0167	260	0.881 K|+0	`s: S \mid p(s) \vdash q(s) \quad \text { or } \quad p(s) \vdash_{s: S} q(s) \text {. }`	$s: S \mid p(s) \vdash q(s) \quad \text{ or } \quad p(s) \vdash_{s: S} q(s).$	$s: S \mid p(s) \vdash q(s) \quad \text{ or } \quad p(s) \vdash_{s:S} q(s).$
fong-spivak-invitation_ EQ0129 (6.2)	200	0.882 S|+0	`[f, g](x)= \begin{cases}f(x) & \text { if } x= \iota_{A}(a) \text { for some } a \in A, \\ g(x) & \text { if } x=\iota_{B}(b) \text { for some } b \in B . \end{cases}`	$[f, g](x)=\begin{cases}f(x) & \text{ if } x=\iota_A(a) \text{ for some } a \in A, \\ g(x) & \text{ if } x=\iota_B(b) \text{ for some } b \in B.\end{cases}$	$[f, g](x) = \begin{cases} f(x) & \text{if } x = \iota_A(a) \text{ for some } a \in A, \\ g(x) & \text{if } x = \iota_B(b) \text{ for some } b \in B. \end{cases}$
fong-spivak-invitation_ EQ0144	228	0.883 K|+0	`\begin{aligned} (g \circ i f)\left(x_{1}, \ldots, x_{i-1}, w_{1} \right.\left., \ldots, w_{m}, x_{i+1}, \ldots, x_{n}\right) \\ & =g\left(x_{1}, \ldots, x_{i-1}, f\left(w_{1}, \ldots, w_{m}\right), x_{i+1}, \ldots, x_{n}\right) \end{aligned}`	$\begin{aligned} (g \circ i f)\left(x_{1}, \ldots, x_{i-1}, w_{1} \right.\left., \ldots, w_{m}, x_{i+1}, \ldots, x_{n}\right) \\ & =g\left(x_{1}, \ldots, x_{i-1}, f\left(w_{1}, \ldots, w_{m}\right), x_{i+1}, \ldots, x_{n}\right) \end{aligned}$	$\begin{aligned} (g \circ_i f)(x_1, \ldots, x_{i-1}, w_1, \ldots, w_m, x_{i+1}, \ldots, x_n) \\ & = g\big(x_1, \ldots, x_{i-1}, f(w_1, \ldots, w_m), x_{i+1}, \ldots, x_n\big) \end{aligned}$
fong-spivak-invitation_ EQ0119	188	0.887 N|-1	`\mathrm{B}(-\mathrm{C})=\{(x,(x, x)) \mid x \in R\} .`	$\mathrm{B}(-\mathrm{C})=\{(x,(x, x)) \mid x \in R\}.$	$\mathsf{B}(\multimap\subset) = \{(x, (x, x)) \mid x \in R\}.$
fong-spivak-invitation_ EQ0165 (7.16)	257	0.892 N|+0	`(U \Rightarrow V):=\bigcup_{\{R \in \mathbf{O} \mathbf{p} \mid R \cap U \subseteq V\}} R .`	$(U \Rightarrow V) := \bigcup_{\{R \in \mathbf{Op} \mid R \cap U \subseteq V\}} R.$	$(U \Rightarrow V) := \bigcup_{\{R \in \mathbf{Op} \mid R \cap U \subseteq V\}} R.$
fong-spivak-invitation_ EQ0153	241	0.910 W|-1	`\ulcorner m\urcorner(y):= \begin{cases}\text { true } & \text { if } m(x)=y \text { for some } x \in X, \\ \text { false } & \text { otherwise } .\end{cases}`	$\ulcorner m \urcorner(y) := \begin{cases} \text{true} & \text{if } m(x)=y \text{ for some } x \in X, \\ \text{false} & \text{otherwise} . \end{cases}$	$\ulcorner m \urcorner(y) := \begin{cases} \texttt{true} & \text{if } m(x) = y \text{ for some } x \in X, \\ \texttt{false} & \text{otherwise.} \end{cases}$

Conf. MathPix confidence: ≥0.9 0.5–0.9 <0.5 — no value
Residual render vs scan (inkdrill): C component W weak S stable N noise K clean not measured

Identifier	Page	Conf.	LaTeX source	Rendered	Scan image
fong-spivak-invitation_ EQ0122 (5.13)	189	■ 0.912 ● N|-2	`B_{1} ; B_{2}:=\left\{(x, z) \mid \text { there exists } y \in R^{n} \text { such that }(x, y) \in B_{1} \text { and }(y, z) \in B_{2}\right\} .`	$B_1 ; B_2 := \{(x, z) \mid \text{ there exists } y \in R^n \text{ such that } (x, y) \in B_1 \text{ and } (y, z) \in B_2\}$.	$B_1 ; B_2 := \{(x, z) \mid \text{there exists } y \in R^n \text{ such that } (x, y) \in B_1 \text{ and } (y, z) \in B_2\}$.
fong-spivak-invitation_ EQ0235	312	■ 0.913 ● K|+0	`A+B=\left(\begin{array}{ccccccc} 3 & 3 & 1 & 0 & 0 & 0 & 0 \\ 2 & 0 & 4 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 2 & 5 & 6 & 1 \end{array}\right) .`	$A+B=\left(\begin{array}{ccccccc} 3 & 3 & 1 & 0 & 0 & 0 & 0 \\ 2 & 0 & 4 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 2 & 5 & 6 & 1 \end{array}\right) .$	$A+B=\left(\begin{array}{ccccccc} 3 & 3 & 1 & 0 & 0 & 0 & 0 \\ 2 & 0 & 4 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 2 & 5 & 6 & 1 \end{array}\right) .$
fong-spivak-invitation_ EQ0005	036	■ 0.924 ● C|+5	`p=g(f(p)) \quad \text { and } \quad q=f(g(q)) \text {. }`	$p=g(f(p)) \quad \text{ and } \quad q=f(g(q)).$	$p=g(f(p)) \quad \text{ and } \quad q=f(g(q)).$
fong-spivak-invitation_ EQ0193	289	■ 0.936 ● W|-2	`\begin{aligned} ((M * N) * P)(w, z) & =\bigvee_{y \in Y} \left(\bigvee_{x \in X} M(w, x) \otimes N(x, y)\right) \otimes P(y, z) \\ & \cong \bigvee_{y \in Y, x \in X} M(w, x) \otimes N(x, y) \otimes P(y, z) \\ & \cong \bigvee_{x \in X} M(w, x) \otimes \left(\bigvee_{y \in Y} N(x, y) \otimes P(y, z)\right) \\ & =(M *(N * P))(w, z) \end{aligned}`	$\begin{aligned} ((M * N) * P)(w, z) & =\bigvee_{y \in Y} \left(\bigvee_{x \in X} M(w, x) \otimes N(x, y)\right) \otimes P(y, z) \\ & \cong \bigvee_{y \in Y, x \in X} M(w, x) \otimes N(x, y) \otimes P(y, z) \\ & \cong \bigvee_{x \in X} M(w, x) \otimes \left(\bigvee_{y \in Y} N(x, y) \otimes P(y, z)\right) \\ & =(M *(N * P))(w, z) \end{aligned}$	$\begin{aligned} ((M * N) * P)(w, z) & =\bigvee_{y \in Y} \left(\bigvee_{x \in X} M(w, x) \otimes N(x, y)\right) \otimes P(y, z) \\ & \cong \bigvee_{y \in Y, x \in X} M(w, x) \otimes N(x, y) \otimes P(y, z) \\ & \cong \bigvee_{x \in X} M(w, x) \otimes \left(\bigvee_{y \in Y} N(x, y) \otimes P(y, z)\right) \\ & =(M *(N * P))(w, z). \end{aligned}$
fong-spivak-invitation_ EQ0093	144	■ 0.937 ● C|+19	`\widehat{F}(p, q):=\mathcal{Q}(F(p), q) \quad \text { and } \quad \check{F}(q, p):=\mathcal{Q}(q, F(p)) .`	$\widehat{F}(p, q) := \mathcal{Q}(F(p), q) \quad \text{ and } \quad \check{F}(q, p) := \mathcal{Q}(q, F(p)).$	$\widehat{F}(p, q) := \mathcal{Q}(F(p), q) \quad \text{ and } \quad \check{F}(q, p) := \mathcal{Q}(q, F(p)).$
fong-spivak-invitation_ EQ0174 (7.19)	268	■ 0.937 ● W|+0	`\begin{aligned} & \forall(t: \mathbb{R}) \cdot @_{t} \left(\operatorname{bad} _ \text {pos }(D)\right) \Rightarrow \\ & \exists(r: \mathbb{R}) \cdot(0<r<1) \wedge \forall\left(r^{\prime}: \mathbb{R}\right) \cdot 0 \leq r^{\prime} \leq 5 \Rightarrow @_{t+r+r^{\prime}}(\operatorname{engaged}(T)) . \end{aligned}`	$\begin{aligned} & \forall(t: \mathbb{R}) \cdot @_{t} (\text{bad_pos } (D)) \Rightarrow \\ & \exists(r: \mathbb{R}) \cdot (0 < r < 1) \wedge \forall (r' : \mathbb{R}) \cdot 0 \leq r' \leq 5 \Rightarrow @_{t+r+r'}(\text{engaged}(T)). \end{aligned}$	$\begin{aligned} & \forall(t: \mathbb{R}). @_{t}(\text{bad_pos}(D)) \Rightarrow \\ & \exists(r: \mathbb{R}). (0 < r < 1) \wedge \forall(r' : \mathbb{R}). 0 \leq r' \leq 5 \Rightarrow @_{t+r+r'}(\text{engaged}(T)). \end{aligned}$
fong-spivak-invitation_ EQ0079	127	■ 0.943 ● C|+3	`\begin{aligned} \lim _{\mathcal{J}} D:=\left\{ \left(d_{1}, \ldots, d_{n}\right) \mid d_{i} \in\right. & D\left(v_{i}\right) \text { for all } 1 \leq i \leq n \text { and } \\ & \text { for all } \left.a: v_{i} \rightarrow v_{j} \in A, \text { we have } D(a) \left(d_{i}\right)=d_{j}\right\} \end{aligned}`	$\begin{aligned} \lim_{\mathcal{J}} D := \{(d_1, \ldots, d_n) \mid d_i \in D(v_i) \text{ for all } 1 \leq i \leq n \text{ and} \\ \text{for all } a : v_i \to v_j \in A, \text{ we have } D(a)(d_i) = d_j\} \end{aligned}$	$\begin{aligned} \lim_{\mathcal{J}} D := \big\{(d_1, \ldots, d_n) \mid d_i \in D(v_i) \text{ for all } 1 \leq i \leq n \text{ and} \\ \text{for all } a : v_i \to v_j \in A, \text{ we have } D(a)(d_i) = d_j\big\} \end{aligned}$
fong-spivak-invitation_ EQ0226	305	■ 0.948 ● W|+1	`x \xrightarrow{\alpha^{-1}} x \times \mathbf{1} \xrightarrow{\mathrm{U}_{x} \times \eta_{x}} x \times x^{\mathrm{op}} \times x \xrightarrow{\epsilon_{x} \times \mathrm{U}_{x}} \mathbf{1} \times x \xrightarrow{\alpha} x`	$x \xrightarrow{\alpha^{-1}} x \times \mathbf{1} \xrightarrow{\mathrm{U}_{x} \times \eta_{x}} x \times x^{\mathrm{op}} \times x \xrightarrow{\epsilon_{x} \times \mathrm{U}_{x}} \mathbf{1} \times x \xrightarrow{\alpha} x$	$\mathcal{X} \xrightarrow{\alpha^{-1}} \mathcal{X} \times \mathbf{1} \xrightarrow{\mathrm{U}_{\mathcal{X}} \times \eta_{\mathcal{X}}} \mathcal{X} \times \mathcal{X}^{\mathrm{op}} \times \mathcal{X} \xrightarrow{\epsilon_{\mathcal{X}} \times \mathrm{U}_{\mathcal{X}}} \mathbf{1} \times \mathcal{X} \xrightarrow{\alpha} \mathcal{X}$
fong-spivak-invitation_ EQ0145 (6.22)	228	■ 0.950 ● N|+0	`(g \circ i f): X_{1} \times \cdots \times X_{i-1} \times W_{1} \times \cdots \times W_{m} \times X_{i+1} \times \cdots \times X_{n} \longrightarrow Y,`	$(g \circ i f): X_1 \times \cdots \times X_{i-1} \times W_1 \times \cdots \times W_m \times X_{i+1} \times \cdots \times X_n \longrightarrow Y,$	$(g \circ_i f): X_1 \times \cdots \times X_{i-1} \times W_1 \times \cdots \times W_m \times X_{i+1} \times \cdots \times X_n \longrightarrow Y,$
fong-spivak-invitation_ EQ0207	293	■ 0.954 ● S|+0	`(F ; G)(f ; g)=G(F(f) ; F(g))=G(F(f)) ; G(F(g))`	$(F ; G)(f ; g)=G(F(f) ; F(g))=G(F(f)) ; G(F(g))$	$(F ; G)(f ; g)=G(F(f) ; F(g))=G(F(f)) ; G(F(g))$

Conf. MathPix confidence: ■ ≥0.9 ■ 0.5–0.9 ■ <0.5 — no value

Residual render vs scan (inkdrill): ● C component ● W weak ● S stable ● N noise ● K clean ● not measured

Identifier	Page	Conf.	LaTeX source	Rendered	Scan image
fong-spivak-invitation_ EQ0048 (2.24)	084	■ 0.954 ● C|+13	`\left(v \otimes \bigvee_{a \in A} a\right) \cong \bigvee_{a \in A}(v \otimes a) .`	$\left(v \otimes \bigvee_{a \in A} a\right) \cong \bigvee_{a \in A}(v \otimes a).$	$\left(v \otimes \bigvee_{a \in A} a\right) \cong \bigvee_{a \in A}(v \otimes a).$
fong-spivak-invitation_ EQ0219	300	■ 0.957 ● W|+0	`\begin{aligned} \Phi=M_{X}^{3} * M_{\Phi} * M_{Y}^{2} & = \left(\begin{array}{cccc} 0 & 6 & 3 & 11 \\ 2 & 0 & 5 & 5 \\ 5 & 3 & 0 & 8 \\ 11 & 9 & 6 & 0 \end{array}\right) \left(\begin{array}{ccc} \infty & \infty & \infty \\ 11 & \infty & \infty \\ \infty & \infty & \infty \\ \infty & 9 & \infty \end{array}\right)\left(\begin{array}{lll} 0 & 4 & 3 \\ 3 & 0 & 6 \\ 7 & 4 & 0 \end{array}\right) \\ & = \left(\begin{array}{ccc} 17 & 20 & \infty \\ 11 & 14 & \infty \\ 14 & 17 & \infty \\ 20 & 9 & \infty \end{array}\right)\left(\begin{array}{lll} 0 & 4 & 3 \\ 3 & 0 & 6 \\ 7 & 4 & 0 \end{array}\right) \end{aligned}`	$\begin{aligned} \Phi=M_{X}^{3} * M_{\Phi} * M_{Y}^{2} & = \left(\begin{array}{cccc} 0 & 6 & 3 & 11 \\ 2 & 0 & 5 & 5 \\ 5 & 3 & 0 & 8 \\ 11 & 9 & 6 & 0 \end{array}\right) \left(\begin{array}{ccc} \infty & \infty & \infty \\ 11 & \infty & \infty \\ \infty & \infty & \infty \\ \infty & 9 & \infty \end{array}\right)\left(\begin{array}{lll} 0 & 4 & 3 \\ 3 & 0 & 6 \\ 7 & 4 & 0 \end{array}\right) \\ & = \left(\begin{array}{ccc} 17 & 20 & \infty \\ 11 & 14 & \infty \\ 14 & 17 & \infty \\ 20 & 9 & \infty \end{array}\right)\left(\begin{array}{lll} 0 & 4 & 3 \\ 3 & 0 & 6 \\ 7 & 4 & 0 \end{array}\right) \end{aligned}$	$\begin{aligned} \Phi=M_{X}^{3} * M_{\Phi} * M_{Y}^{2} & = \left(\begin{array}{cccc} 0 & 6 & 3 & 11 \\ 2 & 0 & 5 & 5 \\ 5 & 3 & 0 & 8 \\ 11 & 9 & 6 & 0 \end{array}\right) \left(\begin{array}{ccc} \infty & \infty & \infty \\ 11 & \infty & \infty \\ \infty & \infty & \infty \\ \infty & 9 & \infty \end{array}\right)\left(\begin{array}{lll} 0 & 4 & 3 \\ 3 & 0 & 6 \\ 7 & 4 & 0 \end{array}\right) \\ & = \left(\begin{array}{ccc} 17 & 20 & \infty \\ 11 & 14 & \infty \\ 14 & 17 & \infty \\ 20 & 9 & \infty \end{array}\right)\left(\begin{array}{lll} 0 & 4 & 3 \\ 3 & 0 & 6 \\ 7 & 4 & 0 \end{array}\right) \end{aligned}$
fong-spivak-invitation_ EQ0072	120	■ 0.959 ● N|-2	`\Sigma_{F}(I)(\text { Airline Seat })=I(\text { Economy }) \sqcup I(\text { First Class }) .`	$\Sigma_F(I)(\text{ Airline Seat }) = I(\text{ Economy }) \sqcup I(\text{ First Class }).$	$\Sigma_F(I)(\text{Airline Seat}) = I(\text{Economy}) \sqcup I(\text{First Class}).$
fong-spivak-invitation_ EQ0103	159	■ 0.962 ● N|+0	`\eta_{X}: \mathbf{1} \times \mathcal{X}^{\mathrm{op}} \times \mathcal{X} \rightarrow \mathcal{V} ;`	$\eta_X : \mathbf{1} \times \mathcal{X}^{\mathrm{op}} \times \mathcal{X} \rightarrow \mathcal{V};$	$\eta_{\mathcal{X}} : \mathbf{1} \times \mathcal{X}^{\mathrm{op}} \times \mathcal{X} \rightarrow \mathcal{V};$
fong-spivak-invitation_ EQ0046	083	■ 0.964 ● N|+0	`a+c \rightarrow d \quad \text { iff } \quad a \rightarrow(c \multimap d) .`	$a+c \rightarrow d \quad \text{iff} \quad a \rightarrow (c \multimap d).$	$a+c \rightarrow d \quad \text{iff} \quad a \rightarrow (c \multimap d).$
fong-spivak-invitation_ EQ0110	176	■ 0.965 ● N|+0	`\begin{aligned} \dot{x}+3 \ddot{y}-2 z & =0, \\ \ddot{y}+5 \dot{z} & =0 . \end{aligned}`	$\begin{aligned} \dot{x}+3 \ddot{y}-2 z & =0, \\ \ddot{y}+5 \dot{z} & =0. \end{aligned}$	$\begin{aligned} \dot{x}+3 \ddot{y}-2 z & =0, \\ \ddot{y}+5 \dot{z} & =0. \end{aligned}$
fong-spivak-invitation_ EQ0172	265	■ 0.965 ● N|+0	`\mathbb{R} \cong\{[d, u] \in \mathbb{I} \mathbb{R} \mid d=u\} .`	$\mathbb{R} \cong \{[d, u] \in \mathbb{IR} \mid d=u\}.$	$\mathbb{R} \cong \{[d, u] \in \mathbb{IR} \mid d=u\}.$
fong-spivak-invitation_ EQ0216	300	■ 0.965 ● N|-1	`X\left(x^{\prime}, x\right) \otimes y\left(y, y^{\prime} \right) \leq \Phi(x, y) \multimap \Phi\left(x^{\prime}, y^{\prime}\right) .`	$X\left(x^{\prime}, x\right) \otimes y\left(y, y^{\prime}\right) \leq \Phi(x, y) \multimap \Phi\left(x^{\prime}, y^{\prime}\right).$	$\mathcal{X}(x', x) \otimes \mathcal{Y}(y, y') \leq \Phi(x, y) \multimap \Phi(x', y').$
fong-spivak-invitation_ EQ0250	316	■ 0.966 ● C|-4	`\left\{(y, z) \mid \text { there exists } x \in R^{m} \text { such that } y=S(g)(x) \text { and } S(h)(x)=z \right\} .`	$\left\{(y, z) \mid \text{ there exists } x \in R^{m} \text{ such that } y=S(g)(x) \text{ and } S(h)(x)=z\right\}.$	$\{(y, z) \mid \text{ there exists } x \in R^{m} \text{ such that } y=S(g)(x) \text{ and } S(h)(x)=z\}.$
fong-spivak-invitation_ EQ0168	261	■ 0.967 ● N|+1	`\forall(t: T) . p(s, t) .`	$\forall(t: T).p(s, t).$	$\forall(t: T).\ p(s, t).$
fong-spivak-invitation_ EQ0007	040	■ 0.967 ● C|+6	`f(a) \vee f(b) \nsupseteq f(a \vee b) .`	$f(a) \vee f(b) \not\supseteq f(a \vee b).$	$f(a) \vee f(b) \ncong f(a \vee b).$
fong-spivak-invitation_ EQ0101	158	■ 0.969 ● N|-1	`(\mathcal{X} \times \mathcal{Y})\left((x, y),\left(x^{ \prime}, y^{\prime}\right)\right):=\mathcal{X}\left(x, x^{\prime}\right) \otimes y\left(y, y^{\prime}\right) .`	$(\mathcal{X} \times \mathcal{Y})\left((x, y),\left(x^{ \prime}, y^{\prime}\right)\right):=\mathcal{X}\left(x, x^{\prime}\right) \otimes y\left(y, y^{\prime}\right) .$	$(\mathcal{X} \times \mathcal{Y})((x, y), (x', y')) := \mathcal{X}(x, x') \otimes \mathcal{Y}(y, y').$
fong-spivak-invitation_ EQ0094 (4.11)	145	■ 0.970 ● N|+0	`\mathcal{P}(p, G(q)) \cong Q(F(p), q) .`	$\mathcal{P}(p, G(q)) \cong Q(F(p), q).$	$\mathcal{P}(p, G(q)) \cong \mathcal{Q}(F(p), q).$
fong-spivak-invitation_ EQ0213	299	■ 0.971 ● N|-1	`\lim _{\mathcal{J}} D:=\left\{\left(d_{1}, d_{2}\right) \mid d_{1} \in X \text { and } d_{2} \in Y\right\},`	$\lim_{\mathcal{J}} D := \{(d_1, d_2) \mid d_1 \in X \text{ and } d_2 \in Y\},$	$\lim_{\mathcal{J}} D := \left\{(d_1, d_2) \mid d_1 \in X \text{ and } d_2 \in Y\right\},$

Conf. MathPix confidence: ■ ≥0.9 ■ 0.5–0.9 ■ <0.5 — no value
Residual render vs scan (inkdrill): ● C component ● W weak ● S stable ● N noise ● K clean ● not measured

Identifier	Page	Conf.	LaTeX source	Rendered	Scan image
fong-spivak-invitation_ EQ0259	328	■ 0.972 ● S|+0	`p ; h_{3}=r ; g ; h_{3}=r ; h_{2} ; g^{\prime}=q ; f^{\prime} ; g^{\prime},`	$p; h_3 = r; g; h_3 = r; h_2; g' = q; f'; g',$	$p \fatsemi h_3 = r \fatsemi g \fatsemi h_3 = r \fatsemi h_2 \fatsemi g' = q \fatsemi f' \fatsemi g',$
fong-spivak-invitation_ EQ0152 (7.5)	241	■ 0.972 ● K|+0	`\Omega_{\text {Set }}:=\mathbb{B}=\{\text { true }, \text { false }\} .`	$\Omega_{\text{Set}} := \mathbb{B} = \{\text{ true }, \text{ false }\}.$	$\Omega_{\textbf{Set}} := \mathbb{B} = \{\texttt{true}, \texttt{false}\}.$
fong-spivak-invitation_ EQ0068 (3.13)	117	■ 0.979 ● K|+0	`f(p) \leq q \text { iff } p \leq g(q) .`	$f(p) \leq q \text{ iff } p \leq g(q).$	$f(p) \leq q \text{ iff } p \leq g(q).$
fong-spivak-invitation_ EQ0111	176	■ 0.979 ● W|+2	`\begin{array}{r} D x+3 D^{2} y-2 z=0 \\ D^{2} y+5 D z=0 \end{array}`	$\begin{array}{r} Dx+3D^{2} y-2 z=0 \\ D^{2} y+5 D z=0 \end{array}$	$\begin{array}{r} Dx+3D^{2} y-2 z=0, \\ D^{2} y+5 D z=0, \end{array}$
fong-spivak-invitation_ EQ0104 (5.2)	163	■ 0.979 ● N|+0	`i \longmapsto \begin{cases}f(i) & \text { if } 1 \leq i \leq m, \\ m^{\prime}+g(i) & \text { if } m+1 \leq i \leq m+n .\end{cases}`	$i \longmapsto \begin{cases} f(i) & \text{ if } 1 \leq i \leq m, \\ m^{\prime}+g(i) & \text{ if } m+1 \leq i \leq m+n. \end{cases}$	$i \longmapsto \begin{cases} f(i) & \text{ if } 1 \leq i \leq m, \\ m^{\prime}+g(i) & \text{ if } m+1 \leq i \leq m+n. \end{cases}$
fong-spivak-invitation_ EQ0016	047	■ 0.980 ● N|-1	`f_{!}\left(A^{\prime}\right):=\left\{b \in B \mid \text { there exists } a \in A^{\prime} \text { such that } f(a)=b\right\} .`	$f_{!}\left(A^{\prime}\right) := \left\{b \in B \mid \text{ there exists } a \in A^{\prime} \text{ such that } f(a)=b\right\}.$	$f_{!}\left(A^{\prime}\right) := \left\{b \in B \mid \text{ there exists } a \in A^{\prime} \text{ such that } f(a)=b\right\}.$
fong-spivak-invitation_ EQ0076	122	■ 0.982 ● N|+0	`\begin{array}{c|c} 1 & \\ \hline \text { Bob-Grace-Pat-Emmy } & \\ \text { Sue-Doug } & \end{array}`	$\begin{array}{c\|c} 1 & \\ \hline \text{Bob-Grace-Pat-Emmy} & \\ \text{Sue-Doug} & \end{array}$	$\begin{array}{c\|c} \mathbf{1} & \\ \hline \text{Bob-Grace-Pat-Emmy} & \\ \text{Sue-Doug} & \end{array}$
fong-spivak-invitation_ EQ0034	067	■ 0.983 ● K|+0	`\text { Cost }:=([0, \infty], \geq, 0,+),`	$\text{Cost } := ([0, \infty], \geq, 0, +),$	$\textbf{Cost} := ([0, \infty], \geq, 0, +),$
fong-spivak-invitation_ EQ0131	206	■ 0.985 ● C|+28	`\operatorname{colim}_{\mathcal{J}} D:=\{(v, d) \mid v \in V \text { and } d \in D(v)\} / \sim`	$\operatorname{colim}_{\mathcal{J}} D := \{(v, d) \mid v \in V \text{ and } d \in D(v)\} / \sim$	$\operatorname{colim}_{\mathcal{J}} D := \big\{(v, d) \mid v \in V \text{ and } d \in D(v)\big\} / \sim$
fong-spivak-invitation_ EQ0247	316	■ 0.986 ● N|-2	`\left\{(x, y) \mid \text { there exists } z \in R^{n} \text { such that } S(g)(x)=z \text { and } z=S(h)(y) \right\} .`	$\left\{(x, y) \mid \text{ there exists } z \in R^{n} \text{ such that } S(g)(x)=z \text{ and } z=S(h)(y)\right\}.$	$\left\{(x, y) \mid \text{ there exists } z \in R^{n} \text{ such that } S(g)(x)=z \text{ and } z=S(h)(y)\right\}.$
fong-spivak-invitation_ EQ0017	047	■ 0.988 ● K|+0	`f_{*}\left(A^{\prime}\right):=\left\{b \in B \mid \text { for all } a \text { such that } f(a)=b, \text { we have } a \in A^{\prime}\right\} .`	$f_{*}\left(A^{\prime}\right) := \left\{b \in B \mid \text{ for all } a \text{ such that } f(a)=b, \text{ we have } a \in A^{\prime}\right\}.$	$f_{*}\left(A^{\prime}\right) := \left\{b \in B \mid \text{ for all } a \text{ such that } f(a)=b, \text{ we have } a \in A^{\prime}\right\}.$
fong-spivak-invitation_ EQ0069	118	■ 0.988 ● C|+8	`\alpha_{c, d}: \mathcal{C}(c, R(d)) \stackrel{\cong}{ \rightarrow} \mathcal{D}(L(c), d)`	$\alpha_{c,d}: \mathcal{C}(c, R(d)) \stackrel{\cong}{\rightarrow} \mathcal{D}(L(c), d)$	$\alpha_{c,d}: \mathcal{C}(c, R(d)) \stackrel{\cong}{\rightarrow} \mathcal{D}(L(c), d)$
fong-spivak-invitation_ EQ0228	307	■ 0.992 ● K|+0	`\sigma_{m, n}(i):= \begin{cases}i+n & \text { if } i \leq m, \\ i-m & \text { if } m+1 \leq i .\end{cases}`	$\sigma_{m,n}(i) := \begin{cases} i+n & \text{ if } i \leq m, \\ i-m & \text{ if } m+1 \leq i. \end{cases}$	$\sigma_{m,n}(i) := \begin{cases} i+n & \text{ if } i \leq m, \\ i-m & \text{ if } m+1 \leq i. \end{cases}$
fong-spivak-invitation_ EQ0126 (and)	191	■ 0.992 ● K|+0	`\{(0,(x, x)) \mid x \in R\} \subseteq R^{0} \times R^{2} \quad \text { and } \quad\{((x, x), 0) \mid x \in R\} \subseteq R^{2} \times R^{0} .`	$\{(0,(x, x)) \mid x \in R\} \subseteq R^{0} \times R^{2} \quad \text{ and } \quad \{((x, x), 0) \mid x \in R\} \subseteq R^{2} \times R^{0}.$	$\{(0,(x, x)) \mid x \in R\} \subseteq R^{0} \times R^{2} \quad \text{ and } \quad \{((x, x), 0) \mid x \in R\} \subseteq R^{2} \times R^{0}.$
fong-spivak-invitation_ EQ0161 (7.13)	255	■ 0.992 ● K|+0	`\Omega(U):=\left\{U^{\prime} \in \mathbf{O p} \mid U^{ \prime} \subseteq U\right\} .`	$\Omega(U) := \left\{U^{\prime} \in \mathbf{Op} \mid U^{\prime} \subseteq U\right\}.$	$\Omega(U) := \left\{U^{\prime} \in \mathbf{Op} \mid U^{\prime} \subseteq U\right\}.$
fong-spivak-invitation_ EQ0042	079	■ 0.993 ● K|+0	`\mathcal{X}\left(x_{1}, x_{2}\right) \leq y\left(F \left(x_{1}\right), F\left(x_{2}\right)\right),`	$\mathcal{X}\left(x_{1}, x_{2}\right) \leq y\left(F\left(x_{1}\right), F\left(x_{2}\right)\right),$	$\mathcal{X}\left(x_{1}, x_{2}\right) \leq \mathcal{Y}\left(F\left(x_{1}\right), F\left(x_{2}\right)\right),$
fong-spivak-invitation_ EQ0164 (7.15)	257	■ 0.994 ● K|+0	`(U \wedge V):=U \cap V \quad \text { and } \quad(U \vee V):=U \cup V .`	$(U \wedge V) := U \cap V \quad \text{ and } \quad (U \vee V) := U \cup V.$	$(U \wedge V) := U \cap V \quad \text{ and } \quad (U \vee V) := U \cup V.$
fong-spivak-invitation_ EQ0171	265	■ 0.994 ● N|+0	`\mathbb{I} \mathbb{R}:=\{[d, u] \subseteq \mathbb{R} \mid d \leq u\} .`	$\mathbb{I}\mathbb{R} := \{[d, u] \subseteq \mathbb{R} \mid d \leq u\}.$	$\mathbb{I}\mathbb{R} := \{[d, u] \subseteq \mathbb{R} \mid d \leq u\}.$

Conf. MathPix confidence: ■ ≥0.9 ■ 0.5–0.9 ■ <0.5 — no value
Residual render vs scan (inkdrill): ● C component ● W weak ● S stable ● N noise ● K clean ● not measured

Identifier	Page	Conf.	LaTeX source	Rendered	Scan image
fong-spivak-invitation_ EQ0192	289	■ 0.994 ● N|+1	`\begin{aligned} I_{X} * M(x, y) & =\bigvee_{x^{\prime} \in X} I_{X}\left(x, x^{\prime}\right) \otimes M\left(x^{\prime}, y\right) \\ & =\left(I_{X}(x, x) \otimes M(x, y)\right) \vee\left(\bigvee_{x^{\prime} \in X, x^{\prime} \neq x} I_{X}\left(x, x^{\prime}\right) \otimes M\left(x^{\prime}, y\right)\right) \\ & =(I \otimes M(x, y)) \vee\left(\bigvee_{x^{\prime} \in X, x^{\prime} \neq x} 0 \otimes M\left(x^{\prime}, y\right)\right) \\ & =M(x, y) \vee 0=M(x, y) \end{aligned}`	$\begin{aligned} I_X * M(x,y) &= \bigvee_{x' \in X} I_X(x,x') \otimes M(x',y) \\ &= (I_X(x,x) \otimes M(x,y)) \vee \left(\bigvee_{x' \in X, x' \neq x} I_X(x,x') \otimes M(x',y)\right) \\ &= (I \otimes M(x,y)) \vee \left(\bigvee_{x' \in X, x' \neq x} 0 \otimes M(x',y)\right) \\ &= M(x,y) \vee 0 = M(x,y) \end{aligned}$	$\begin{aligned} I_X * M(x,y) &= \bigvee_{x' \in X} I_X(x,x') \otimes M(x',y) \\ &= (I_X(x,x) \otimes M(x,y)) \vee \left(\bigvee_{x' \in X, x' \neq x} I_X(x,x') \otimes M(x',y)\right) \\ &= (I \otimes M(x,y)) \vee \left(\bigvee_{x' \in X, x' \neq x} 0 \otimes M(x',y)\right) \\ &= M(x,y) \vee 0 = M(x,y). \end{aligned}$
fong-spivak-invitation_ EQ0113 (5.7)	178	■ 0.995 ● N|+0	`M ; N(a, c):=\sum_{b \in \underline{n}} M(a, b) \times N(b, c) .`	$M ; N(a, c) := \sum_{b \in \underline{n}} M(a, b) \times N(b, c).$	$M \mathbin{;} N(a, c) := \sum_{b \in \underline{n}} M(a, b) \times N(b, c).$
fong-spivak-invitation_ EQ0056 (3.6)	096	■ 0.995 ● N|+2	`\mathbf{3}:=\text { Free } \mid \stackrel{v_{1}}{\bullet} \xrightarrow{f_{1}} \stackrel{v_{2}}{\bullet} \xrightarrow{f_{2}} \stackrel{v_{3}}{\bullet}`	$\mathbf{3} := \text{Free} \mid \overset{v_1}{\bullet} \xrightarrow{f_1} \overset{v_2}{\bullet} \xrightarrow{f_2} \overset{v_3}{\bullet}$	$\mathbf{3} := \text{Free} \mid \overset{v_1}{\bullet} \xrightarrow{f_1} \overset{v_2}{\bullet} \xrightarrow{f_2} \overset{v_3}{\bullet}$
fong-spivak-invitation_ EQ0195	290	■ 0.996 ● K|+0	`t(p):= \begin{cases}v & \text { if } n=0, \\ t\left(a_{n} \right) & \text { if } n \geq 1 .\end{cases}`	$t(p) := \begin{cases} v & \text{if } n = 0, \\ t(a_n) & \text{if } n \geq 1. \end{cases}$	$t(p) := \begin{cases} v & \text{if } n = 0, \\ t(a_n) & \text{if } n \geq 1. \end{cases}$
fong-spivak-invitation_ EQ0002 (1.5)	023	■ 0.996 ● C|+3	`A=\bigcup_{p \in P} A_{p} \quad \text { and } \quad \text { if } p \neq q \text { then } A_{p} \cap A_{q}= \varnothing .`	$A = \bigcup_{p \in P} A_p \quad \text{and} \quad \text{if } p \neq q \text{ then } A_p \cap A_q = \varnothing.$	$A = \bigcup_{p \in P} A_p \quad \text{and} \quad \text{if } p \neq q \text{ then } A_p \cap A_q = \varnothing.$
fong-spivak-invitation_ EQ0189	288	■ 0.996 ● K|+0	`A \cap B \subseteq(\bar{B} \cup C) \cap B=(\bar{B} \cap B) \cup(C \cap B)=C \cap B \subseteq C .`	$A \cap B \subseteq (\bar{B} \cup C) \cap B = (\bar{B} \cap B) \cup (C \cap B) = C \cap B \subseteq C.$	$A \cap B \subseteq (\bar{B} \cup C) \cap B = (\bar{B} \cap B) \cup (C \cap B) = C \cap B \subseteq C.$
fong-spivak-invitation_ EQ0136	217	■ 0.996 ● C|+15	`\varphi_{c_{1}, c_{2}}: F\left(c_{1}\right) \otimes_{ \mathcal{D}} F\left(c_{2}\right) \rightarrow F\left(c_{1} \otimes_{\mathcal{C}} c_{2}\right),`	$\varphi_{c_1,c_2} : F(c_1) \otimes_{\mathcal{D}} F(c_2) \to F(c_1 \otimes_{\mathcal{C}} c_2),$	$\varphi_{c_1,c_2} : F(c_1) \otimes_{\mathcal{D}} F(c_2) \to F(c_1 \otimes_{\mathcal{C}} c_2),$
fong-spivak-invitation_ EQ0009	042	■ 0.997 ● N|+0	`\lceil x / 3\rceil \leq y \text { if and only if } x \leq 3 y .`	$\lceil x/3 \rceil \leq y$ if and only if $x \leq 3y$.	$\lceil x/3 \rceil \leq y$ if and only if $x \leq 3y$.
fong-spivak-invitation_ EQ0053	087	■ 0.997 ● C|+7	`\left(\begin{array}{cc} \text { false } & \text { false } \\ \text { false } & \text { true } \\ \text { true } & \text { true } \end{array}\right) *\left(\begin{array}{ccc} \text { true } & \text { true } & \text { false } \\ \text { true } & \text { false } & \text { true } \end{array}\right)=\left(\begin{array}{ccc} \text { false } & \text { false } & \text { false } \\ \text { false } & \text { true } & \text { true } \\ \text { true } & \text { true } & \text { true } \end{array}\right)`	$\begin{pmatrix} \text{false} & \text{false} \\ \text{false} & \text{true} \\ \text{true} & \text{true} \end{pmatrix} * \begin{pmatrix} \text{true} & \text{true} & \text{false} \\ \text{true} & \text{false} & \text{true} \end{pmatrix} = \begin{pmatrix} \text{false} & \text{false} & \text{false} \\ \text{false} & \text{true} & \text{true} \\ \text{true} & \text{true} & \text{true} \end{pmatrix}$	$\begin{pmatrix} \text{false} & \text{false} \\ \text{false} & \text{true} \\ \text{true} & \text{true} \end{pmatrix} * \begin{pmatrix} \text{true} & \text{true} & \text{false} \\ \text{true} & \text{false} & \text{true} \end{pmatrix} = \begin{pmatrix} \text{false} & \text{false} & \text{false} \\ \text{true} & \text{false} & \text{true} \\ \text{true} & \text{true} & \text{true} \end{pmatrix}$
fong-spivak-invitation_ EQ0231	310	■ 0.997 ● N|+0	`[], \quad[a], \quad[b], \quad[a, a], \quad[a, b], \quad \ldots, \quad[b, a, b, b, a, b, a, a, a, a], \quad \ldots`	$[], \quad [a], \quad [b], \quad [a,a], \quad [a,b], \quad \ldots, \quad [b,a,b,b,a,b,a,a,a,a], \quad \ldots$	$[\,], \quad [a], \quad [b], \quad [a,a], \quad [a,b], \quad \ldots, \quad [b,a,b,b,a,b,a,a,a,a], \quad \ldots$

Conf. MathPix confidence: ■ ≥0.9 ■ 0.5–0.9 ■ <0.5 — no value
Residual render vs scan (inkdrill): ● C component ● W weak ● S stable ● N noise ● K clean ● not measured

Identifier	Page	Conf.	LaTeX source	Rendered	Scan image
fong-spivak-invitation_ EQ0049	086	0.997 N|+1	`d(U, V):=\sup _{u \in U} \inf _{v \in V} d(u, v), \quad X(U, V):=\bigwedge_{u \in U} \bigvee_{v \in V} X(u, v)`	$d(U,V) := \sup_{u\in U} \inf_{v\in V} d(u,v), \quad X(U,V) := \bigwedge_{u\in U} \bigvee_{v\in V} X(u,v)$	$d(U, V) \coloneqq \sup_{u\in U} \inf_{v\in V} d(u, v), \qquad \mathcal{X}(U, V) \coloneqq \bigwedge_{u\in U} \bigvee_{v\in V} \mathcal{X}(u, v).$
fong-spivak-invitation_ EQ0215	300	0.997 N|+0	`\left(\mathcal{X}^{\mathrm{op}} \times y\right)\left((x, y),\left(x^{\prime}, y^{\prime}\right)\right) \leq \mathcal{V}\left(\Phi(x, y), \Phi\left(x^{\prime}, y^{\prime}\right)\right) .`	$\left(\mathcal{X}^{\mathrm{op}} \times y\right)\left((x, y),\left(x^{\prime}, y^{\prime}\right)\right) \leq \mathcal{V}\left(\Phi(x, y), \Phi\left(x^{\prime}, y^{\prime}\right)\right) .$	$(\mathcal{X}^{\mathrm{op}} \times \mathcal{Y})\big((x, y), (x', y')\big) \leq \mathcal{V}\big(\Phi(x, y), \Phi(x', y')\big).$
fong-spivak-invitation_ EQ0108	169	0.998 N|+0	`a \subset \bullet \supset b`	$a \subset \bullet \supset b$	$a \circlearrowright \bullet \circlearrowleft b$
fong-spivak-invitation_ EQ0166 (7.17)	260	0.998 K|+0	`\left(\left|\Omega^{S}\right|, \leq^{S}\right) .`	$\left(\left\|\Omega^{S}\right\|, \leq^{S}\right) .$	$(\|\Omega^{S}\|, \leq^{S}).$
fong-spivak-invitation_ EQ0011	045	0.998 C|+14	`g(\bigwedge A) \cong \bigwedge g(A) .`	$g(\bigwedge A) \cong \bigwedge g(A).$	$g\left(\bigwedge A\right) \cong \bigwedge g(A).$
fong-spivak-invitation_ EQ0106	166	0.998 K|+0	`\iota^{\prime \prime}(x)= \begin{cases}\iota(x) & \text { if } \iota(x) \in I, \\ \iota^{\prime}(\iota(x)) & \text { if } \iota(x) \in \underline{n}, \\ \iota^{\prime}(x) & \text { if } x \in O^{\prime} .\end{cases}`	$\iota''(x) = \begin{cases}\iota(x) & \text{ if } \iota(x) \in I, \\ \iota'(\iota(x)) & \text{ if } \iota(x) \in \underline{n}, \\ \iota'(x) & \text{ if } x \in O'.\end{cases}$	$\iota''(x) = \begin{cases}\iota(x) & \text{ if } \iota(x) \in I, \\ \iota'(\iota(x)) & \text{ if } \iota(x) \in \underline{n}, \\ \iota'(x) & \text{ if } x \in O'.\end{cases}$
fong-spivak-invitation_ EQ0008 (1.6)	041	0.999 C|+3	`f(p) \leq q \quad \text { if and only if } \quad p \leq g(q) .`	$f(p) \leq q \quad \text{ if and only if } \quad p \leq g(q).$	$f(p) \leq q \quad \text{ if and only if } \quad p \leq g(q).$
fong-spivak-invitation_ EQ0212	298	0.999 W|+0	`\left(c_{1}, d_{1}\right) \xrightarrow{\left(f_{1}, g_{1}\right)}\left(c_{2}, d_{2}\right) \xrightarrow{\left(f_{2}, g_{2}\right)}\left(c_{3}, d_{3}\right) \xrightarrow{\left(f_{3}, g_{3}\right)}\left(c_{4}, d_{4}\right) .`	$\left(c_{1}, d_{1}\right) \xrightarrow{\left(f_{1}, g_{1}\right)}\left(c_{2}, d_{2}\right) \xrightarrow{\left(f_{2}, g_{2}\right)}\left(c_{3}, d_{3}\right) \xrightarrow{\left(f_{3}, g_{3}\right)}\left(c_{4}, d_{4}\right) .$	$\left(c_{1}, d_{1}\right) \xrightarrow{\left(f_{1}, g_{1}\right)}\left(c_{2}, d_{2}\right) \xrightarrow{\left(f_{2}, g_{2}\right)}\left(c_{3}, d_{3}\right) \xrightarrow{\left(f_{3}, g_{3}\right)}\left(c_{4}, d_{4}\right).$
fong-spivak-invitation_ EQ0232	310	0.999 N|+0	`G:=\left\{\rho_{m, n}: m \rightarrow n \mid m, n \in \mathbb{N}\right\}, \quad s\left(\rho_{m, n}\right):=m, \quad t\left(\rho_{m, n}\right):=n ;`	$G:=\left\{\rho_{m, n}: m \rightarrow n \mid m, n \in \mathbb{N}\right\}, \quad s\left(\rho_{m, n}\right):=m, \quad t\left(\rho_{m, n}\right):=n;$	$G \coloneqq \{\rho_{m,n} \colon m \to n \mid m, n \in \mathbb{N}\}, \qquad s(\rho_{m,n}) \coloneqq m, \quad t(\rho_{m,n}) \coloneqq n;$
fong-spivak-invitation_ EQ0253	318	0.999 W|-2	`\begin{aligned} f(m) *_{R} f(n) & =(\underbrace{1_{R}+ \cdots+1_{R}}_{m \text { summands }}) * R(\underbrace{1_{R}+\cdots+1_{R}}_{n \text { summands }}) \\ & =\underbrace{1_{R} *(\underbrace{1_{R}+ \cdots+1_{R}}_{n \text { summands }})+\cdots+1_{R} *(\underbrace{1_{R}+\cdots+1_{R}}_{n \text { summands }})}_{m \text { summands }} \\ & =\underbrace{1_{R}+ \cdots+1_{R}}_{m n \text { summands }}=f(m * n) . \end{aligned}`	$\begin{aligned} f(m) *_{R} f(n) &= (\underbrace{1_{R}+ \cdots+1_{R}}_{m \text { summands }}) * R(\underbrace{1_{R}+\cdots+1_{R}}_{n \text { summands }}) \\ &= \underbrace{1_{R} *(\underbrace{1_{R}+ \cdots+1_{R}}_{n \text { summands }})+\cdots+1_{R} *(\underbrace{1_{R}+\cdots+1_{R}}_{n \text { summands }})}_{m \text { summands }} \\ &= \underbrace{1_{R}+ \cdots+1_{R}}_{m n \text { summands }}=f(m * n) . \end{aligned}$	$\begin{aligned} f(m) *_{R} f(n) &= (\underbrace{1_{R}+ \cdots+1_{R}}_{m \text { summands }}) *_{R} (\underbrace{1_{R}+\cdots+1_{R}}_{n \text { summands }}) \\ &= \underbrace{1_{R} *(\underbrace{1_{R}+ \cdots+1_{R}}_{n \text { summands }})+\cdots+1_{R} *(\underbrace{1_{R}+\cdots+1_{R}}_{n \text { summands }})}_{m \text { summands }} \\ &= \underbrace{1_{R}+ \cdots+1_{R}}_{m n \text { summands }}=f(m * n) . \end{aligned}$
fong-spivak-invitation_ EQ0146	230	0.999 C|+17	`(f \circ i g):=(\mathrm{id} \otimes, \ldots, \otimes \mathrm{id} \otimes g \otimes \mathrm{id} \otimes, \ldots, \otimes \mathrm{id}) ; f,`	$(f \circ i g):=(\mathrm{id} \otimes, \ldots, \otimes \mathrm{id} \otimes g \otimes \mathrm{id} \otimes, \ldots, \otimes \mathrm{id}) ; f,$	$(f \circ_i g) \coloneqq (\mathrm{id} \otimes, \ldots, \otimes \mathrm{id} \otimes g \otimes \mathrm{id} \otimes, \ldots, \otimes \mathrm{id}) \fatsemi f,$

Conf. MathPix confidence: ■ ≥0.9 ■ 0.5–0.9 ■ <0.5 — no value
Residual render vs scan (inkdrill): • C component • W weak • S stable • N noise • K clean • not measured

Identifier	Page	Conf.	LaTeX source	Rendered	Scan image
fong-spivak-invitation_ EQ0015	047	0.999 K|+0	`f\left(g\left(q_{0}\right)\right)=\bigwedge\left\{q \in Q \mid g\left(q_{0}\right) \leq g(q)\right\} \leq \bigwedge \left\{q_{0}\right\}=q_{0},`	$f\left(g\left(q_0\right)\right)=\bigwedge\left\{q \in Q \mid g\left(q_0\right) \leq g(q)\right\} \leq \bigwedge\left\{q_0\right\}=q_0,$	$f\left(g\left(q_0\right)\right)=\bigwedge\left\{q \in Q \mid g\left(q_0\right) \leq g(q)\right\} \leq \bigwedge\left\{q_0\right\}=q_0,$
fong-spivak-invitation_ EQ0081 (4.3)	134	0.999 K|+0	`b \wedge c \leq d \quad \text { iff } \quad b \leq(c \Rightarrow d) .`	$b \wedge c \leq d \quad \text{iff} \quad b \leq(c \Rightarrow d).$	$b \wedge c \leq d \quad \text{iff} \quad b \leq(c \Rightarrow d).$
fong-spivak-invitation_ EQ0091 (4.10)	142	0.999 S|+0	`\begin{aligned} \mathcal{P}\left(p, p_{1}\right) \otimes \Phi\left(p_{1}, q\right) & =\mathcal{P}\left(p, p_{1} \right) \otimes \Phi\left(p_{1}, q\right) \otimes I \ \ & \leq \mathcal{P}\left(p, p_{1}\right) \otimes \Phi \left(p_{1}, q\right) \otimes \mathcal{Q}(q, q) \leq \Phi(p, q) . \end{aligned}`	$\begin{aligned} \mathcal{P}\left(p, p_1\right) \otimes \Phi\left(p_1, q\right) & =\mathcal{P}\left(p, p_1\right) \otimes \Phi\left(p_1, q\right) \otimes I \\ & \leq \mathcal{P}\left(p, p_1\right) \otimes \Phi\left(p_1, q\right) \otimes \mathcal{Q}(q, q) \leq \Phi(p, q). \end{aligned}$	$\begin{aligned} \mathcal{P}(p, p_1) \otimes \Phi(p_1, q) & = \mathcal{P}(p, p_1) \otimes \Phi(p_1, q) \otimes I \\ & \leq \mathcal{P}(p, p_1) \otimes \Phi(p_1, q) \otimes \mathcal{Q}(q, q) \leq \Phi(p, q). \end{aligned}$
fong-spivak-invitation_ EQ0157	248	0.999 N|+1	`\mathbf{O p}_{1}:=\{\varnothing,\{1\}, X\} \quad \text { and } \quad \mathbf{O p}_{2}:=\{\varnothing,\{2\}, X\} .`	$\mathbf{Op}_1 := \{\varnothing, \{1\}, X\} \quad \text{and} \quad \mathbf{Op}_2 := \{\varnothing, \{2\}, X\}.$	$\mathbf{Op}_1 := \{\varnothing, \{1\}, X\} \quad \text{and} \quad \mathbf{Op}_2 := \{\varnothing, \{2\}, X\}.$
fong-spivak-invitation_ EQ0183	276	0.999 W|+0	`f^{*}(P)=\{\{x \in \mathbb{Z} \mid x \leq 0\},\{x \in \mathbb{Z} \mid x \geq 1\}\} \quad \text { and } \quad f^{*}(Q)=\{\{0\},\{x \in \mathbb{Z} \mid x \neq 0\}\} .`	$f^{*}(P)=\{\{x \in \mathbb{Z} \mid x \leq 0\},\{x \in \mathbb{Z} \mid x \geq 1\}\} \quad \text{and} \quad f^{*}(Q)=\{\{0\},\{x \in \mathbb{Z} \mid x \neq 0\}\}.$	$f^{*}(P)=\{\{x \in \mathbb{Z} \mid x \leq 0\},\{x \in \mathbb{Z} \mid x \geq 1\}\} \quad \text{and} \quad f^{*}(Q)=\{\{0\},\{x \in \mathbb{Z} \mid x \neq 0\}\}.$
fong-spivak-invitation_ EQ0245	316	0.999 N|-1	`B+C:=\left\{(w, y, x, z) \in R^{m+p} \times R^{n+q} \mid(w, x) \in B \text { and }(y, z) \in C\right\} .`	$B+C:=\left\{(w, y, x, z) \in R^{m+p} \times R^{n+q} \mid(w, x) \in B \text{ and } (y, z) \in C\right\}.$	$B+C:=\{(w, y, x, z) \in R^{m+p} \times R^{n+q} \mid (w, x) \in B \text{ and } (y, z) \in C\}.$
fong-spivak-invitation_ EQ0039	078	0.999 W|-2	`\begin{array}{rlr} I_{W} & \leq f\left(I_{V}\right) & (f \text { is monoidal monotone }) \\ & \leq f(\mathcal{C}(c, c)) & (\mathcal{C} \text { is } \mathcal{V} \text {-category }) \\ & =\mathcal{C}_{f}(c, c) & (\text { definition of } \mathcal{C}_{f}) ; \end{array}`	$\begin{array}{rlr} I_W & \leq f\left(I_V\right) & (f \text{ is monoidal monotone }) \\ & \leq f(\mathcal{C}(c, c)) & (\mathcal{C} \text{ is } \mathcal{V}\text{-category }) \\ & =\mathcal{C}_f(c, c) & (\text{ definition of } \mathcal{C}_f) ; \end{array}$	$\begin{array}{rlr} I_W & \leq f\left(I_V\right) & (f \text{ is monoidal monotone}) \\ & \leq f(\mathcal{C}(c, c)) & (\mathcal{C} \text{ is } \mathcal{V}\text{-category}) \\ & =\mathcal{C}_f(c, c) & (\text{definition of } \mathcal{C}_f); \end{array}$
fong-spivak-invitation_ EQ0142 (6.16)	221	0.999 W|+0	`\begin{aligned} \psi_{V, V^{\prime}}: \operatorname{Circ}(V) \times \operatorname{Circ} \left(V^{\prime}\right) & \longrightarrow \operatorname{Circ}\left(V+V^{\prime}\right) ; \\ \left((V, A, s, t, \ell),\left(V^{\prime}, A^{\prime}, s^{\prime}, t^{\prime}, \ell^{\prime}\right)\right) & \longmapsto\left(V+V^{\prime}, A+A^{\prime}, s+s^{ \prime}, t+t^{\prime},\left[\ell, \ell^{\prime}\right] \right) . \end{aligned}`	$\begin{aligned} \psi_{V, V^{\prime}}: \operatorname{Circ}(V) \times \operatorname{Circ}\left(V^{\prime}\right) & \longrightarrow \operatorname{Circ}\left(V+V^{\prime}\right) ; \\ \left((V, A, s, t, \ell),\left(V^{\prime}, A^{\prime}, s^{\prime}, t^{\prime}, \ell^{\prime}\right)\right) & \longmapsto\left(V+V^{\prime}, A+A^{\prime}, s+s^{\prime}, t+t^{\prime},\left[\ell, \ell^{\prime}\right]\right). \end{aligned}$	$\begin{aligned} \psi_{V, V'}: \mathsf{Circ}(V) \times \mathsf{Circ}(V') & \longrightarrow \mathsf{Circ}(V+V'); \\ \left((V, A, s, t, \ell),\left(V', A', s', t', \ell'\right)\right) & \longmapsto\left(V+V', A+A', s+s', t+t',\left[\ell, \ell'\right]\right). \end{aligned}$
fong-spivak-invitation_ EQ0052 (2.26)	087	1.000 N|-1	`(M * N)(x, z):=\bigvee_{y \in Y} M(x, y) \otimes N(y, z) .`	$(M * N)(x, z):=\bigvee_{y \in Y} M(x, y) \otimes N(y, z).$	$(M * N)(x, z):=\bigvee_{y \in Y} M(x, y) \otimes N(y, z).$
fong-spivak-invitation_ EQ0054	087	1.000 W|+2	`I_{X}(x, y):= \begin{cases}I & \text { if } x=y \\ 0 & \text { if } x \neq y\end{cases}`	$I_X(x, y):=\begin{cases} I & \text{if } x=y \\ 0 & \text{if } x \neq y \end{cases}$	$I_X(x, y):=\begin{cases} I & \text{if } x=y, \\ 0 & \text{if } x \neq y. \end{cases}$
fong-spivak-invitation_ EQ0063	113	1.000 C|-3	`\alpha_{\text {Vertex }}: G(\text { Vertex }) \rightarrow H(\text { Vertex }) \quad \text { and } \quad \alpha_{ \text {Arrow }}: G(\text { Arrow }) \rightarrow H(\text { Arrow }),`	$\alpha_{\text{Vertex }}: G(\text{ Vertex }) \rightarrow H(\text{ Vertex }) \quad \text{and} \quad \alpha_{\text{Arrow }}: G(\text{ Arrow }) \rightarrow H(\text{ Arrow }),$	$\alpha_{\text{Vertex}}: G(\text{Vertex}) \rightarrow H(\text{Vertex}) \quad \text{and} \quad \alpha_{\text{Arrow}}: G(\text{Arrow}) \rightarrow H(\text{Arrow}),$
fong-spivak-invitation_ EQ0067 (3.12)	116	1.000 N|+0	`\text { Gr } \xrightarrow{F} \text { DDS } \xrightarrow{I} \text { Set. }`	$\text{Gr} \xrightarrow{F} \text{DDS} \xrightarrow{I} \text{Set}.$	$\mathbf{Gr} \xrightarrow{F} \mathbf{DDS} \xrightarrow{I} \mathbf{Set}.$

Conf. MathPix confidence: ■ ≥0.9 ■ 0.5–0.9 ■ <0.5 — no value
Residual render vs scan (inkdrill): • C component • W weak • S stable • N noise • K clean • not measured

Identifier	Page	Conf.	LaTeX source	Rendered	Scan image
fong-spivak-invitation_ EQ0181	273	■ 1.000 ● K|+0	`1 \leq 1, \quad 1 \leq 2, \quad 1 \leq 3, \quad 2 \leq 2, \quad 2 \leq 3, \quad 3 \leq 3, \quad 4 \leq 4 .`	$1 \leq 1, \quad 1 \leq 2, \quad 1 \leq 3, \quad 2 \leq 2, \quad 2 \leq 3, \quad 3 \leq 3, \quad 4 \leq 4.$	$1 \leq 1, \quad 1 \leq 2, \quad 1 \leq 3, \quad 2 \leq 2, \quad 2 \leq 3, \quad 3 \leq 3, \quad 4 \leq 4.$
fong-spivak-invitation_ EQ0220	301	■ 1.000 ● N|+1	`=\left(\begin{array}{ccc} 17 & 20 & 20 \\ 11 & 14 & 14 \\ 14 & 17 & 17 \\ 12 & 9 & 15 \end{array}\right) .`	$= \left(\begin{array}{ccc} 17 & 20 & 20 \\ 11 & 14 & 14 \\ 14 & 17 & 17 \\ 12 & 9 & 15 \end{array}\right).$	$= \left(\begin{array}{ccc} 17 & 20 & 20 \\ 11 & 14 & 14 \\ 14 & 17 & 17 \\ 12 & 9 & 15 \end{array}\right).$
fong-spivak-invitation_ EQ0258	324	■ 1.000 ● W|+0	`\begin{aligned} \varphi_{S^{\prime}, T^{\prime}}\left(\left(\operatorname{im}_{f} \times \operatorname{im}_{g}\right)(A \times B)\right) & =\varphi_{S^{\prime}, T^{ \prime}}(\{f(a) \mid a \in A\} \times\{g(b) \mid b \in B\}) \\ & =\{(f(a), g(b)) \mid a \in A, b \in B\} \\ & =\operatorname{im}_{f \times g}(A \times B) \\ & =\operatorname{im}_{f \times g}\left(\varphi_{S, T}(A, B)\right) . \end{aligned}`	$\begin{aligned} \varphi_{S^{\prime}, T^{\prime}}\left(\left(\operatorname{im}_{f} \times \operatorname{im}_{g}\right)(A \times B)\right) & =\varphi_{S^{\prime}, T^{\prime}}(\{f(a) \mid a \in A\} \times\{g(b) \mid b \in B\}) \\ & =\{(f(a), g(b)) \mid a \in A, b \in B\} \\ & =\operatorname{im}_{f \times g}(A \times B) \\ & =\operatorname{im}_{f \times g}\left(\varphi_{S, T}(A, B)\right) . \end{aligned}$	$\begin{aligned} \varphi_{S^{\prime}, T^{\prime}}\left(\left(\operatorname{im}_{f} \times \operatorname{im}_{g}\right)(A \times B)\right) & =\varphi_{S^{\prime}, T^{\prime}}(\{f(a) \mid a \in A\} \times\{g(b) \mid b \in B\}) \\ & =\{(f(a), g(b)) \mid a \in A, b \in B\} \\ & =\operatorname{im}_{f \times g}(A \times B) \\ & =\operatorname{im}_{f \times g}(\varphi_{S, T}(A, B)). \end{aligned}$
fong-spivak-invitation_ EQ0001 (1.4)	020	■ 1.000 ● K|+0	`\Phi(A) \vee \Phi(B) \leq \Phi(A \vee B) .`	$\Phi(A) \vee \Phi(B) \leq \Phi(A \vee B).$	$\Phi(A) \vee \Phi(B) \leq \Phi(A \vee B).$
fong-spivak-invitation_ EQ0004	026	■ 1.000 ● K|+0	`f(11)=a, \quad f(12)=a, \quad f(13)=b, \quad f(21)=c, \quad f(22)=d, \quad f(23)=d .`	$f(11)=a, \quad f(12)=a, \quad f(13)=b, \quad f(21)=c, \quad f(22)=d, \quad f(23)=d.$	$f(11)=a, \quad f(12)=a, \quad f(13)=b, \quad f(21)=c, \quad f(22)=d, \quad f(23)=d.$
fong-spivak-invitation_ EQ0006	037	■ 1.000 ● K|+0	`\left\{\left.\frac{1}{n+1} \right\rvert\, n \in \mathbb{N}\right\}=\left\{1, \frac{1}{2}, \frac{1}{3}, \frac{1}{4}, \ldots\right\} \subseteq \mathbb{R}`	$\left\{\left.\frac{1}{n+1} \right\rvert\, n \in \mathbb{N}\right\}=\left\{1, \frac{1}{2}, \frac{1}{3}, \frac{1}{4}, \ldots\right\} \subseteq \mathbb{R}$	$\left\{\left.\frac{1}{n+1} \right\rvert\, n \in \mathbb{N}\right\}=\left\{1, \frac{1}{2}, \frac{1}{3}, \frac{1}{4}, \ldots\right\} \subseteq \mathbb{R}$
fong-spivak-invitation_ EQ0012	045	■ 1.000 ● C|+7	`f(\bigvee A) \cong \bigvee f(A)`	$f(\bigvee A) \cong \bigvee f(A)$	$f\left(\bigvee A\right) \cong \bigvee f(A).$
fong-spivak-invitation_ EQ0013 (1.8)	046	■ 1.000 ● K|+0	`f(p):=\bigwedge\{q \in Q \mid p \leq g(q)\} ;`	$f(p) := \bigwedge\{q \in Q \mid p \leq g(q)\};$	$f(p) := \bigwedge\{q \in Q \mid p \leq g(q)\};$
fong-spivak-invitation_ EQ0014	047	■ 1.000 ● N|+0	`p_{0} \leq \bigwedge\left\{g(q) \in P \mid p_{0} \leq g(q)\right\} \cong g\left(\bigwedge\left\{q \in Q \mid p_{0} \leq g(q)\right\}\right)=g\left(f\left(p_{0}\right) \right),`	$p_0 \leq \bigwedge\{g(q) \in P \mid p_0 \leq g(q)\} \cong g\left(\bigwedge\{q \in Q \mid p_0 \leq g(q)\}\right)=g\left(f\left(p_0\right)\right),$	$p_0 \leq \bigwedge\{g(q) \in P \mid p_0 \leq g(q)\} \cong g\left(\bigwedge\{q \in Q \mid p_0 \leq g(q)\}\right)=g(f(p_0)),$
fong-spivak-invitation_ EQ0019 (2.2)	055	■ 1.000 ● N|+0	`m * e=m, \quad e * m=m, \quad(m * n) * p=m *(n * p)`	$m * e=m, \quad e * m=m, \quad(m * n) * p=m *(n * p)$	$m * e=m, \quad e * m=m, \quad(m * n) * p=m *(n * p)$
fong-spivak-invitation_ EQ0026 (2.8)	060	■ 1.000 ● N|+0	`t \leq v+w, \quad w+u \leq x+z, \quad v+x \leq y,`	$t \leq v+w, \quad w+u \leq x+z, \quad v+x \leq y,$	$t \leq v+w, \quad w+u \leq x+z, \quad v+x \leq y,$
fong-spivak-invitation_ EQ0027 (2.9)	060	■ 1.000 ● N|+0	`t+u \leq y+z .`	$t+u \leq y+z.$	$t+u \leq y+z.$
fong-spivak-invitation_ EQ0028 (2.10)	060	■ 1.000 ● N|+0	`t+u \leq v+w+u \leq v+x+z \leq y+z .`	$t+u \leq v+w+u \leq v+x+z \leq y+z.$	$t+u \leq v+w+u \leq v+x+z \leq y+z.$
fong-spivak-invitation_ EQ0029	061	■ 1.000 ● K|+0	`\mathrm{H}_{2} \mathrm{O}, \quad \mathrm{NaCl}, \quad 2 \mathrm{NaOH}, \quad \mathrm{CH}_{4}+3 \mathrm{O}_{2}`	$\mathrm{H}_{2}\mathrm{O}, \quad \mathrm{NaCl}, \quad 2\mathrm{NaOH}, \quad \mathrm{CH}_{4}+3\mathrm{O}_{2}$	$\mathrm{H}_{2}\mathrm{O}, \quad \mathrm{NaCl}, \quad 2\mathrm{NaOH}, \quad \mathrm{CH}_{4}+3\mathrm{O}_{2}$
fong-spivak-invitation_ EQ0030	061	■ 1.000 ● N|+0	`2 \mathrm{H}_{2} \mathrm{O}+2 \mathrm{Na} \rightarrow 2 \mathrm{NaOH}+\mathrm{H}_{2} .`	$2\mathrm{H}_{2}\mathrm{O}+2\mathrm{Na} \rightarrow 2\mathrm{NaOH}+\mathrm{H}_{2}.$	$2\mathrm{H}_{2}\mathrm{O}+2\mathrm{Na} \rightarrow 2\mathrm{NaOH}+\mathrm{H}_{2}.$
fong-spivak-invitation_ EQ0031 (2.11)	062	■ 1.000 ● N|+0	`y+k \rightarrow y^{\prime}+k^{\prime}, \quad x+y^{\prime} \rightarrow z^{\prime}, \quad z^{\prime}+k^{\prime} \rightarrow z+k .`	$y+k \rightarrow y^{\prime}+k^{\prime}, \quad x+y^{\prime} \rightarrow z^{\prime}, \quad z^{\prime}+k^{\prime} \rightarrow z+k.$	$y+k \rightarrow y^{\prime}+k^{\prime}, \quad x+y^{\prime} \rightarrow z^{\prime}, \quad z^{\prime}+k^{\prime} \rightarrow z+k.$

Conf. MathPix confidence: ■ ≥0.9 ■ 0.5–0.9 ■ <0.5 — no value
Residual render vs scan (inkdrill): ● C component ● W weak ● S stable ● N noise ● K clean ● not measured

Identifier	Page	Conf.	LaTeX source	Rendered	Scan image
fong-spivak-invitation_ EQ0032 (2.12)	062	■1.000 ● K|+0	`x+y+k \rightarrow x+y^{\prime}+k^{\prime} \rightarrow z^{ \prime}+k^{\prime} \rightarrow z+k .`	$x+y+k \rightarrow x+y'+k' \rightarrow z'+k' \rightarrow z+k.$	$x+y+k \rightarrow x+y'+k' \rightarrow z'+k' \rightarrow z+k.$
fong-spivak-invitation_ EQ0033 (2.14)	063	■1.000 ● K|+0	`\mathrm{H}_{2} \mathrm{O}+\mathrm{NaCl} \rightarrow{ }^{?} \mathrm{H}_{2} \mathrm{O}`	$\mathrm{H}_{2}\mathrm{O}+\mathrm{NaCl} \rightarrow{}^{?} \mathrm{H}_{2}\mathrm{O}$	$\mathrm{H}_{2}\mathrm{O}+\mathrm{NaCl} \rightarrow{}^{?} \mathrm{H}_{2}\mathrm{O}$
fong-spivak-invitation_ EQ0035	069	■1.000 ● W|+1	`d(x):=\left\{\begin{array}{ll} \text { false } & \text { if } x>0, \\ \text { true } & \text { if } x=0, \end{array} \quad u(x):= \begin{cases}\text { false } & \text { if } x=\infty, \\ \text { true } & \text { if } x<\infty .\end{cases}\right.`	$d(x):=\left\{\begin{array}{ll} \text { false } & \text { if } x>0, \\ \text { true } & \text { if } x=0, \end{array} \quad u(x):= \begin{cases}\text { false } & \text { if } x=\infty, \\ \text { true } & \text { if } x<\infty .\end{cases}\right.$	$d(x):=\left\{\begin{array}{ll} \text { false } & \text { if } x>0, \\ \text { true } & \text { if } x=0, \end{array} \quad u(x):= \begin{cases}\text { false } & \text { if } x=\infty, \\ \text { true } & \text { if } x<\infty .\end{cases}\right.$
fong-spivak-invitation_ EQ0036	073	■1.000 ● N|+0	`d_{L}(U, V):=\sup _{u \in U} \inf _{v \in V} d(u, v),`	$d_{L}(U, V):=\sup_{u \in U} \inf_{v \in V} d(u, v),$	$d_{L}(U, V):=\sup_{u \in U} \inf_{v \in V} d(u, v),$
fong-spivak-invitation_ EQ0038 (2.20)	076	■1.000 ● N|+0	`M_{Y}:=\begin{array}{c|ccc} \nearrow & x & y & z \\ \hline x & 0 & 4 & 3 \\ y & 3 & 0 & \infty \\ z & \infty & 4 & 0 \end{array}`	$M_{Y}:=\begin{array}{c\|ccc} \nearrow & x & y & z \\ \hline x & 0 & 4 & 3 \\ y & 3 & 0 & \infty \\ z & \infty & 4 & 0 \end{array}$	$M_{Y}:=\begin{array}{c\|ccc} \nearrow & x & y & z \\ \hline x & 0 & 4 & 3 \\ y & 3 & 0 & \infty \\ z & \infty & 4 & 0 \end{array}$
fong-spivak-invitation_ EQ0041 (2.21)	078	■1.000 ● N|+0	`f(x):= \begin{cases}\text { true } & \text { if } x=0, \\ \text { false } & \text { if } x>0 .\end{cases}`	$f(x):=\begin{cases}\text { true } & \text { if } x=0, \\ \text { false } & \text { if } x>0 .\end{cases}$	$f(x):=\begin{cases}\text { true } & \text { if } x=0, \\ \text { false } & \text { if } x>0 .\end{cases}$
fong-spivak-invitation_ EQ0044 (2.23)	082	■1.000 ● C|+8	`(a \otimes v) \leq w \quad \text { iff } \quad a \leq(v \multimap w)`	$(a \otimes v) \leq w \quad \text{iff} \quad a \leq(v \multimap w)$	$(a \otimes v) \leq w \quad \text{iff} \quad a \leq(v \multimap w)$
fong-spivak-invitation_ EQ0045	083	■1.000 ● K|+0	`a+x \geq y \quad \text { iff } \quad a \geq y-x \quad \text { iff } \quad \max (0, a) \geq \max (0, y-x) \quad \text { iff } \quad a \geq(x \multimap y)`	$a+x \geq y \quad \text{iff} \quad a \geq y-x \quad \text{iff} \quad \max(0, a) \geq \max(0, y-x) \quad \text{iff} \quad a \geq(x \multimap y)$	$a+x \geq y \quad \text{iff} \quad a \geq y-x \quad \text{iff} \quad \max(0, a) \geq \max(0, y-x) \quad \text{iff} \quad a \geq(x \multimap y)$
fong-spivak-invitation_ EQ0050	086	■1.000 ● N|+0	`v \multimap w:=\bigvee_{\{a \in V \mid a \otimes v \leq w \}} a .`	$v \multimap w:=\bigvee_{\{a \in V \mid a \otimes v \leq w\}} a.$	$v \multimap w:=\bigvee_{\{a \in V \mid a \otimes v \leq w\}} a.$
fong-spivak-invitation_ EQ0051 (2.25)	087	■1.000 ● N|+0	`(M * N)(i, k)=\sum_{j} M(i, j) * N(j, k) .`	$(M * N)(i, k)=\sum_{j} M(i, j) * N(j, k).$	$(M * N)(i, k)=\sum_{j} M(i, j) * N(j, k).$
fong-spivak-invitation_ EQ0058	107	■1.000 ● S|+0	`f^{\prime} ; h^{\prime}=F(f) ; F(h)=F(f ; h)=F(g ; i)=F(g) ; F(i)=g^{\prime} ; i^{\prime} .`	$f^{\prime} ; h^{\prime}=F(f) ; F(h)=F(f ; h)=F(g ; i)=F(g) ; F(i)=g^{\prime} ; i^{\prime}.$	$f^{\prime} ; h^{\prime}=F(f) ; F(h)=F(f ; h)=F(g ; i)=F(g) ; F(i)=g^{\prime} ; i^{\prime}.$
fong-spivak-invitation_ EQ0060 (3.9)	110	■1.000 ● C|+8	`F(f) ; \alpha_{d}=\alpha_{c} ; G(f) .`	$F(f) ; \alpha_{d}=\alpha_{c} ; G(f).$	$F(f) ; \alpha_{d}=\alpha_{c} ; G(f).$
fong-spivak-invitation_ EQ0078	124	■1.000 ● N|+2	`X \times Y:=\{(x, y) \mid x \in X, y \in Y\},`	$X \times Y:=\{(x, y) \mid x \in X, y \in Y\},$	$X \times Y:=\{(x, y) \mid x \in X, y \in Y\},$
fong-spivak-invitation_ EQ0084 (4.5)	137	■1.000 ● N|+2	`\Phi(B, x)=11, \quad \Phi(A, z)=20, \quad \Phi(C, y)=17 .`	$\Phi(B, x)=11, \quad \Phi(A, z)=20, \quad \Phi(C, y)=17.$	$\Phi(B, x)=11, \quad \Phi(A, z)=20, \quad \Phi(C, y)=17.$
fong-spivak-invitation_ EQ0086 (4.7)	140	■1.000 ● N|+1	`(\Phi ; \Psi)(p, r):=\bigvee_{q \in Q} \Phi(p, q) \wedge \Psi(q, r)`	$(\Phi ; \Psi)(p, r):=\bigvee_{q \in Q} \Phi(p, q) \wedge \Psi(q, r)$	$(\Phi ; \Psi)(p, r):=\bigvee_{q \in Q} \Phi(p, q) \wedge \Psi(q, r).$
fong-spivak-invitation_ EQ0087	141	■1.000 ● C|+13	`(\Phi ; \Psi)(p, r)=\bigvee_{q \in Q}(\Phi(p, q) \otimes \Psi(q, r)) .`	$(\Phi ; \Psi)(p, r)=\bigvee_{q \in Q}(\Phi(p, q) \otimes \Psi(q, r)).$	$(\Phi ; \Psi)(p, r)=\bigvee_{q \in Q}(\Phi(p, q) \otimes \Psi(q, r)).$

Conf. MathPix confidence: ■ ≥0.9 ■ 0.5–0.9 ■ <0.5 — no value
Residual render vs scan (inkdrill): ● C component ● W weak ● S stable ● N noise ● K clean ● not measured

Identifier	Page	Conf.	LaTeX source	Rendered	Scan image
fong-spivak-invitation_ EQ0098	150	1.000 N|+1	`\alpha_{s, t, u}:\{(s,(t, u)) \mid s \in S, t \in T, u \in U\} \xrightarrow{\cong}\{((s, t), u) \mid s \in S, t \in T, u \in U\} .`	$\alpha_{s,t,u}:\{(s,(t,u)) \mid s \in S, t \in T, u \in U\} \xrightarrow{\cong} \{((s,t),u) \mid s \in S, t \in T, u \in U\}.$	$\alpha_{s,t,u}\colon \{(s,(t,u)) \mid s \in S, t \in T, u \in U\} \xrightarrow{\cong} \{((s,t),u) \mid s \in S, t \in T, u \in U\}.$
fong-spivak-invitation_ EQ0102	158	1.000 N|-1	`(\Phi \times \Psi)\left(\left(x_{1}, y_{1}\right), \left(x_{2}, y_{2}\right)\right):=\Phi\left(x_{1}, x_{2}\right) \otimes \Psi\left(y_{1}, y_{2}\right) .`	$(\Phi \times \Psi)\left(\left(x_1, y_1\right), \left(x_2, y_2\right)\right) := \Phi\left(x_1, x_2\right) \otimes \Psi\left(y_1, y_2\right).$	$(\Phi \times \Psi)((x_1, y_1), (x_2, y_2)) \coloneqq \Phi(x_1, x_2) \otimes \Psi(y_1, y_2).$
fong-spivak-invitation_ EQ0105	164	1.000 N|-1	`R ; S:=\{(i, k) \in \underline{m} \times \underline{p} \mid \exists(j \in \underline{n}) .(i, j) \in R \text { and }(j, k) \in S\} .`	$R ; S := \{(i, k) \in \underline{m} \times \underline{p} \mid \exists(j \in \underline{n}).(i, j) \in R \text{ and } (j, k) \in S\}.$	$R \fatsemi S \coloneqq \{(i, k) \in \underline{m} \times \underline{p} \mid \exists(j \in \underline{n}).\, (i, j) \in R \text{ and } (j, k) \in S\}.$
fong-spivak-invitation_ EQ0109 (5.5)	170	1.000 N|+0	`G:=\left\{\rho_{m, n} \mid m, n \in \mathbb{N}\right\}, \quad s\left(\rho_{m, n}\right):=m, \quad t\left(\rho_{m, n}\right):=n,`	$G := \left\{\rho_{m,n} \mid m, n \in \mathbb{N}\right\}, \quad s\left(\rho_{m,n}\right) := m, \quad t\left(\rho_{m,n}\right) := n,$	$G \coloneqq \{\rho_{m,n} \mid m, n \in \mathbb{N}\}, \qquad s(\rho_{m,n}) \coloneqq m, \quad t(\rho_{m,n}) \coloneqq n,$
fong-spivak-invitation_ EQ0115	178	1.000 K|+0	`A=\left(\begin{array}{lll} 3 & 3 & 1 \\ 2 & 0 & 4 \end{array}\right), \quad B=\left(\begin{array}{llll} 2 & 5 & 6 & 1 \end{array}\right) .`	$A = \begin{pmatrix} 3 & 3 & 1 \\ 2 & 0 & 4 \end{pmatrix}, \quad B = \begin{pmatrix} 2 & 5 & 6 & 1 \end{pmatrix}.$	$A = \begin{pmatrix} 3 & 3 & 1 \\ 2 & 0 & 4 \end{pmatrix}, \qquad B = \begin{pmatrix} 2 & 5 & 6 & 1 \end{pmatrix}.$
fong-spivak-invitation_ EQ0117	181	1.000 K|+0	`\sum_{j \in \underline{n}} \alpha(i, j) * \beta(j, k) .`	$\sum_{j \in \underline{n}} \alpha(i, j) * \beta(j, k).$	$\sum_{j \in \underline{n}} \alpha(i, j) * \beta(j, k).$
fong-spivak-invitation_ EQ0120 (5.11)	188	1.000 K|+0	`\mathrm{B}(g)=\left\{(x, S(g)(x)) \mid x \in R^{m}\right\} \subseteq R^{m} \times R^{n} .`	$\mathrm{B}(g) = \{(x, S(g)(x)) \mid x \in R^m\} \subseteq R^m \times R^n.$	$\mathsf{B}(g) = \left\{\left(x, S(g)(x)\right) \mid x \in R^m\right\} \subseteq R^m \times R^n.$
fong-spivak-invitation_ EQ0121 (5.12)	188	1.000 K|+0	`\mathrm{B}\left(g^{\mathrm{op}}\right):=\left\{(S(g)(x), x) \mid x \in R^{m}\right\} \subseteq R^{n} \times R^{m} .`	$\mathrm{B}\left(g^{\mathrm{op}}\right) := \{(S(g)(x), x) \mid x \in R^m\} \subseteq R^n \times R^m.$	$\mathsf{B}(g^{\mathrm{op}}) \coloneqq \left\{\left(S(g)(x), x\right) \mid x \in R^m\right\} \subseteq R^n \times R^m.$
fong-spivak-invitation_ EQ0125	190	1.000 N|+0	`\mathrm{B}\left(\left(g^{\mathrm{op}}\right) ; h\right)= \left\{(S(g)(x), S(h)(x)) \mid x \in R^{m}\right\} .`	$\mathrm{B}\left(\left(g^{\mathrm{op}}\right); h\right) = \{(S(g)(x), S(h)(x)) \mid x \in R^m\}.$	$\mathsf{B}((g^{\mathrm{op}}) \fatsemi h) = \{(S(g)(x), S(h)(x)) \mid x \in R^m\}.$
fong-spivak-invitation_ EQ0127	192	1.000 K|+0	`v=\int \frac{1}{m} F(t) d t+u(t)+p \int a u(t)+b v(t) d t .`	$v = \int \frac{1}{m} F(t)dt + u(t) + p \int au(t) + bv(t)dt.$	$v = \int \frac{1}{m} F(t)dt + u(t) + p \int au(t) + bv(t)dt.$
fong-spivak-invitation_ EQ0130	204	1.000 N|+0	`y(0)=y(g(0))=x(f(0))=x(0) .`	$y(0) = y(g(0)) = x(f(0)) = x(0).$	$y(0) = y(g(0)) = x(f(0)) = x(0).$
fong-spivak-invitation_ EQ0133	207	1.000 K|+0	`\{(v, d) \mid d \in D(v)\} .`	$\{(v, d) \mid d \in D(v)\}.$	$\{(v, d) \mid d \in D(v)\}.$
fong-spivak-invitation_ EQ0137 (6.15)	219	1.000 K|+0	`F\left(\left[\iota_{N}, \iota_{P}\right]\right)\left( \varphi_{N, P}(s, t)\right) .`	$F\left(\left[\iota_N, \iota_P\right]\right)\left(\varphi_{N,P}(s,t)\right).$	$F([\iota_N, \iota_P])(\varphi_{N,P}(s,t)).$
fong-spivak-invitation_ EQ0140	221	1.000 N|+0	`\operatorname{Circ}(V):=\{(V, A, s, t, \ell) \mid \text { where } s, t: A \rightarrow V, \ell: E \rightarrow C\} .`	$\operatorname{Circ}(V) := \{(V, A, s, t, \ell) \mid \text{ where } s, t: A \to V, \ell: E \to C\}.$	$\operatorname{Circ}(V) \coloneqq \{(V, A, s, t, \ell) \mid \text{ where } s, t\colon A \to V, \ell\colon E \to C\}.$
fong-spivak-invitation_ EQ0147	230	1.000 C|+6	`F: \mathcal{O}\left(t_{1}, \ldots, t_{n} ; t\right) \rightarrow \mathcal{P}\left(f\left(t_{1}\right), \ldots, f\left(t_{n}\right) ; f(t)\right)`	$F: \mathcal{O}\left(t_1, \ldots, t_n; t\right) \to \mathcal{P}\left(f\left(t_1\right), \ldots, f\left(t_n\right); f(t)\right)$	$F\colon \mathcal{O}(t_1, \ldots, t_n; t) \to \mathcal{P}(f(t_1), \ldots, f(t_n); f(t))$
fong-spivak-invitation_ EQ0154 (7.6)	241	1.000 N|-1	`X=\{y \in Y \mid p(y)=\text { true }\} .`	$X = \{y \in Y \mid p(y) = \text{ true }\}.$	$X = \{y \in Y \mid p(y) = \mathtt{true}\}.$
fong-spivak-invitation_ EQ0158	249	1.000 N|+1	`\left.s_{i}\right|_{U_{i} \cap U_{j}}=\left.s_{j} \right|_{U_{i} \cap U_{j}} .`	$s_i\big\|_{U_i \cap U_j} = s_j\big\|_{U_i \cap U_j}.$	$s_i\big\|_{U_i \cap U_j} = s_j\big\|_{U_i \cap U_j}.$
fong-spivak-invitation_ EQ0162 (7.14)	255	1.000 N|+0	`\begin{aligned} \Omega(U) & \rightarrow \Omega(V), \\ U^{\prime} & \mapsto U^{\prime} \cap V . \end{aligned}`	$\begin{aligned} \Omega(U) & \to \Omega(V), \\ U' & \mapsto U' \cap V. \end{aligned}$	$\begin{aligned} \Omega(U) & \to \Omega(V), \\ U' & \mapsto U' \cap V. \end{aligned}$

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fong-spivak-invitation_EQ0163	256	1.000 K|+0	V \cap U_{j}=\left(\bigcup_{i \in I} V_{i}\right) \cap U_{j}=\bigcup_{i \in I}\left(V_{i} \cap U_{j}\right)= \bigcup_{i \in I}\left(V_{j} \cap U_{i}\right)=\left(\bigcup_{i \in I} U_{i}\right) \cap V_{j}=V_{j} .	$V \cap U_j = \left(\bigcup_{i\in I} V_i\right) \cap U_j = \bigcup_{i\in I}(V_i \cap U_j) = \bigcup_{i\in I}(V_j \cap U_i) = \left(\bigcup_{i\in I} U_i\right) \cap V_j = V_j.$	$V \cap U_j = \left(\bigcup_{i\in I} V_i\right) \cap U_j = \bigcup_{i\in I}(V_i \cap U_j) = \bigcup_{i\in I}(V_j \cap U_i) = \left(\bigcup_{i\in I} U_i\right) \cap V_j = V_j.$
fong-spivak-invitation_EQ0169	261	1.000 W|+1	p(n, z)= \begin{cases}\text { true } & \text { if } n \leq|z|, \\ \text { false } & \text { if } n>|z| . \end{cases}	$p(n, z)=\begin{cases}\text { true } & \text { if } n \leq\|z\|, \\ \text { false } & \text { if } n>\|z\| .\end{cases}$	$p(n, z)=\begin{cases}\text { true } & \text { if } n \leq\|z\|, \\ \text { false } & \text { if } n>\|z\| .\end{cases}$
fong-spivak-invitation_EQ0173	266	1.000 N|+0	S\left(o_{[a, b]}\right) \cong \lim _{\epsilon>0} S \left(o_{[a-\epsilon, b+\epsilon]}\right)	$S\left(o_{[a,b]}\right) \cong \lim_{\epsilon>0} S\left(o_{[a-\epsilon, b+\epsilon]}\right)$	$S\left(o_{[a,b]}\right) \cong \lim_{\epsilon>0} S\left(o_{[a-\epsilon, b+\epsilon]}\right).$
fong-spivak-invitation_EQ0175	271	1.000 K|+0	\varnothing, \quad\{1\}, \quad\{2\}, \quad\{3\}, \quad \{1,2\}, \quad\{1,3\}, \quad\{2,3\}, \quad\{1,2,3\} .	$\varnothing, \quad\{1\}, \quad\{2\}, \quad\{3\}, \quad\{1,2\}, \quad\{1,3\}, \quad\{2,3\}, \quad\{1,2,3\}.$	$\varnothing, \quad\{1\}, \quad\{2\}, \quad\{3\}, \quad\{1,2\}, \quad\{1,3\}, \quad\{2,3\}, \quad\{1,2,3\}.$
fong-spivak-invitation_EQ0176	271	1.000 K|+0	(h, 1), \quad(h, 2), \quad(h, 3), \quad(1,1), \quad(1,2), \quad(1,3) .	$(h, 1), \quad(h, 2), \quad(h, 3), \quad(1,1), \quad(1,2), \quad(1,3).$	$(h, 1), \quad(h, 2), \quad(h, 3), \quad(1,1), \quad(1,2), \quad(1,3).$
fong-spivak-invitation_EQ0177	271	1.000 K|+0	(h, 1), \quad(1,1), \quad(1,2), \quad(2,2), \quad(3,2) .	$(h, 1), \quad(1,1), \quad(1,2), \quad(2,2), \quad(3,2).$	$(h, 1), \quad(1,1), \quad(1,2), \quad(2,2), \quad(3,2).$
fong-spivak-invitation_EQ0178	271	1.000 K|+0	h, \quad 1, \quad 2, \quad 3 .	$h, \quad 1, \quad 2, \quad 3.$	$h, \quad 1, \quad 2, \quad 3.$
fong-spivak-invitation_EQ0179	272	1.000 S|+1	\begin{array}{lllll} (11,11), & (11,12), & (12,11), & (12,12), & (13,13), \\ (21,21), & (22,22), & (22,23), & (23,22), & (23,23). \end{array}	$\begin{array}{lllll} (11,11), & (11,12), & (12,11), & (12,12), & (13,13), \\ (21,21), & (22,22), & (22,23), & (23,22), & (23,23). \end{array}$	$\begin{array}{lllll} (11,11), & (11,12), & (12,11), & (12,12), & (13,13), \\ (21,21), & (22,22), & (22,23), & (23,22), & (23,23). \end{array}$
fong-spivak-invitation_EQ0182	273	1.000 K|+0	(\bullet)(\circ)(*), \quad(\bullet \circ)(*), \quad(\bullet *)(\circ), \quad(\bullet)(\circ *), \quad(\bullet \circ *) .	$(\bullet)(\circ)(*), \quad(\bullet \circ)(*), \quad(\bullet *)(\circ), \quad(\bullet)(\circ *), \quad(\bullet \circ *).$	$(\bullet)(\circ)(*), \quad(\bullet \circ)(*), \quad(\bullet *)(\circ), \quad(\bullet)(\circ *), \quad(\bullet \circ *).$
fong-spivak-invitation_EQ0184	280	1.000 N|+0	g(q) \leq g^{\prime}(f(g(q))) \leq g^{\prime}(q) .	$g(q) \leq g^{\prime}(f(g(q))) \leq g^{\prime}(q).$	$g(q) \leq g^{\prime}(f(g(q))) \leq g^{\prime}(q).$
fong-spivak-invitation_EQ0188	288	1.000 K|+0	A=(A \cap \bar{B}) \cup(A \cap B) \subseteq \bar{B} \cup C .	$A=(A \cap \bar{B}) \cup(A \cap B) \subseteq \bar{B} \cup C.$	$A=(A \cap \bar{B}) \cup(A \cap B) \subseteq \bar{B} \cup C.$
fong-spivak-invitation_EQ0190	288	1.000 W|+0	\left(\begin{array}{ll} 1 & 0 \\ 0 & 1 \end{array} \right), \quad\left(\begin{array}{cc} \text { true } & \text { false } \\ \text { false } & \text { true } \end{array}\right), \quad \text { and } \quad\left(\begin{array}{cc} 0 & \infty \\ \infty & 0 \end{array} \right) .	$\left(\begin{array}{ll} 1 & 0 \\ 0 & 1 \end{array} \right), \quad\left(\begin{array}{cc} \text { true } & \text { false } \\ \text { false } & \text { true } \end{array}\right), \quad \text { and } \quad\left(\begin{array}{cc} 0 & \infty \\ \infty & 0 \end{array} \right) .$	$\left(\begin{array}{ll} 1 & 0 \\ 0 & 1 \end{array} \right), \quad\left(\begin{array}{cc} \text { true } & \text { false } \\ \text { false } & \text { true } \end{array}\right), \quad \text { and } \quad\left(\begin{array}{cc} 0 & \infty \\ \infty & 0 \end{array} \right) .$

Conf. MathPix confidence: ■ ≥0.9 ■ 0.5–0.9 ■ <0.5 — no value
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fong-spivak-invitation_EQ0194	289	1.000 N|+1	`\begin{gathered} M_{X}=\left(\begin{array}{cccc} 0 & \infty & 3 & \infty \\ 2 & 0 & \infty & 5 \\ \infty & 3 & 0 & \infty \\ \infty & \infty & 6 & 0 \end{array}\right), \quad M_{X}^{2}=\left(\begin{array}{cccc} 0 & 6 & 3 & \infty \\ 2 & 0 & 5 & 5 \\ 5 & 3 & 0 & 8 \\ \infty & 9 & 6 & 0 \end{array}\right), \\ M_{X}^{3}=M_{X}^{4}=\left(\begin{array}{cccc} 0 & 6 & 3 & 11 \\ 2 & 0 & 5 & 5 \\ 5 & 3 & 0 & 8 \\ 11 & 9 & 6 & 0 \end{array}\right) . \end{gathered}`	$M_X = \begin{pmatrix} 0 & \infty & 3 & \infty \\ 2 & 0 & \infty & 5 \\ \infty & 3 & 0 & \infty \\ \infty & \infty & 6 & 0 \end{pmatrix}, \quad M_X^2 = \begin{pmatrix} 0 & 6 & 3 & \infty \\ 2 & 0 & 5 & 5 \\ 5 & 3 & 0 & 8 \\ \infty & 9 & 6 & 0 \end{pmatrix},$ $M_X^3 = M_X^4 = \begin{pmatrix} 0 & 6 & 3 & 11 \\ 2 & 0 & 5 & 5 \\ 5 & 3 & 0 & 8 \\ 11 & 9 & 6 & 0 \end{pmatrix}.$	$M_X = \begin{pmatrix} 0 & \infty & 3 & \infty \\ 2 & 0 & \infty & 5 \\ \infty & 3 & 0 & \infty \\ \infty & \infty & 6 & 0 \end{pmatrix}, \quad M_X^2 = \begin{pmatrix} 0 & 6 & 3 & \infty \\ 2 & 0 & 5 & 5 \\ 5 & 3 & 0 & 8 \\ \infty & 9 & 6 & 0 \end{pmatrix},$ $M_X^3 = M_X^4 = \begin{pmatrix} 0 & 6 & 3 & 11 \\ 2 & 0 & 5 & 5 \\ 5 & 3 & 0 & 8 \\ 11 & 9 & 6 & 0 \end{pmatrix}.$
fong-spivak-invitation_EQ0196	290	1.000 N|+0	`(p ; q):=\left(v, a_{1}, \ldots, a_{m}, b_{1}, \ldots, b_{n}\right) .`	$(p;q) := (v, a_1, \ldots, a_m, b_1, \ldots, b_n)\,.$	$(p \fatsemi q) \coloneqq (v, a_1, \ldots, a_m, b_1, \ldots, b_n).$
fong-spivak-invitation_EQ0197	290	1.000 K|+0	`\left(v, a_{1}, \ldots, a_{m}, b_{1}, \ldots, b_{n}, c_{1}, \ldots, c_{o}\right) .`	$(v, a_1, \ldots, a_m, b_1, \ldots, b_n, c_1, \ldots, c_o)\,.$	$(v, a_1, \ldots, a_m, b_1, \ldots, b_n, c_1, \ldots, c_o).$
fong-spivak-invitation_EQ0203	292	1.000 S|+0	`\begin{array}{lll} (1,1) & (1,2) & (1,3) \\ (2,1) & (2,2) & (2,3) \\ (3,1) & (3,2) & (3,3) \end{array}`	$\begin{array}{lll} (1,1) & (1,2) & (1,3) \\ (2,1) & (2,2) & (2,3) \\ (3,1) & (3,2) & (3,3) \end{array}$	$\begin{array}{lll} (1,1) & (1,2) & (1,3) \\ (2,1) & (2,2) & (2,3) \\ (3,1) & (3,2) & (3,3) \end{array}$
fong-spivak-invitation_EQ0204	292	1.000 N|+0	`f^{-1}(1)=b, \quad f^{-1}(2)=a, \quad f^{-1}(3)=c .`	$f^{-1}(1) = b, \quad f^{-1}(2) = a, \quad f^{-1}(3) = c.$	$f^{-1}(1) = b, \quad f^{-1}(2) = a, \quad f^{-1}(3) = c.$
fong-spivak-invitation_EQ0205	293	1.000 W|+0	`\begin{gathered} A^{\prime} \mapsto A, \quad f^{\prime} \mapsto f, \quad g^{\prime} \mapsto g, \quad f^{\prime} ; h^{\prime} \mapsto f ; h, \quad g^{\prime} ; i^{\prime} \mapsto f ; h, \\ B^{\prime} \mapsto B, \quad h^{\prime} \mapsto h, \quad C^{\prime} \mapsto C, \quad i^{\prime} \mapsto i, \quad D^{\prime} \mapsto D . \end{gathered}`	$A' \mapsto A, \quad f' \mapsto f, \quad g' \mapsto g, \quad f'; h' \mapsto f; h, \quad g'; i' \mapsto f; h,$ $B' \mapsto B, \quad h' \mapsto h, \quad C' \mapsto C, \quad i' \mapsto i, \quad D' \mapsto D.$	$A' \mapsto A, \quad f' \mapsto f, \quad g' \mapsto g, \quad f' \fatsemi h' \mapsto f \fatsemi h, \quad g' \fatsemi i' \mapsto f \fatsemi h,$ $B' \mapsto B, \quad h' \mapsto h, \quad C' \mapsto C, \quad i' \mapsto i, \quad D' \mapsto D.$
fong-spivak-invitation_EQ0208	293	1.000 S|+0	`((F ; G) ; H)(c)=H((F ; G)(c))=H(G(F(c)))=(G ; H)(F(c))=(F ;(G ; H))(c) .`	$((F;G);H)(c) = H((F;G)(c)) = H(G(F(c))) = (G;H)(F(c)) = (F;(G;H))(c).$	$((F \fatsemi G) \fatsemi H)(c) = H((F \fatsemi G)(c)) = H(G(F(c))) = (G \fatsemi H)(F(c)) = (F \fatsemi (G \fatsemi H))(c).$
fong-spivak-invitation_EQ0211	297	1.000 S|+0	`\left(f_{1} ; f_{2}\right)^{B}(g)=g ;\left(f_{1} ; f_{2}\right)=\left(g ; f_{1}\right) ; f_{2}=\left(f_{1}^{B} ; f_{2}^{B}\right)(g)`	$(f_1; f_2)^B\,(g) = g; (f_1; f_2) = (g; f_1)\,; f_2 = \left(f_1^B; f_2^B\right)(g)$	$(f_1 \fatsemi f_2)^B(g) = g \fatsemi (f_1 \fatsemi f_2) = (g \fatsemi f_1) \fatsemi f_2 = (f_1^B \fatsemi f_2^B)(g)$
fong-spivak-invitation_EQ0218	300	1.000 N|+0	`\begin{array}{c|ccc} \Phi & x & y & z \\ \hline A & 17 & 20 & 20 \\ B & 11 & 14 & 14 \\ C & 14 & 17 & 17 \\ D & 12 & 9 & 15 \end{array}`	$\begin{array}{c\|ccc} \Phi & x & y & z \\ \hline A & 17 & 20 & 20 \\ B & 11 & 14 & 14 \\ C & 14 & 17 & 17 \\ D & 12 & 9 & 15 \end{array}$	$\begin{array}{c\|ccc} \Phi & x & y & z \\ \hline A & 17 & 20 & 20 \\ B & 11 & 14 & 14 \\ C & 14 & 17 & 17 \\ D & 12 & 9 & 15 \end{array}$
fong-spivak-invitation_EQ0229	307	1.000 K|+0	`(f+g)(i):= \begin{cases}f(i) & \text { if } i \leq m, \\ g(i-m)+m^{\prime} & \text { if } m+1 \leq i .\end{cases}`	$(f+g)(i) := \begin{cases} f(i) & \text{if } i \leq m, \\ g(i-m)+m' & \text{if } m+1 \leq i. \end{cases}$	$(f+g)(i) \coloneqq \begin{cases} f(i) & \text{if } i \leq m, \\ g(i-m)+m' & \text{if } m+1 \leq i. \end{cases}$
fong-spivak-invitation_EQ0230	310	1.000 K|+0	`a^{0}, a^{1}, a^{2}, a^{3}, \ldots, a^{2019}, \ldots`	$a^0, a^1, a^2, a^3, \ldots, a^{2019}, \ldots$	$a^0, a^1, a^2, a^3, \ldots, a^{2019}, \ldots$

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Identifier	Page	Conf.	LaTeX source	Rendered	Scan image
fong-spivak-invitation_EQ0233	311	■1.000 ● K|+0	`\left(\begin{array}{llll} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{array}\right) .`	$\left(\begin{array}{llll} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{array}\right) .$	$\left(\begin{array}{llll} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{array}\right) .$
fong-spivak-invitation_EQ0234	311	■1.000 ● K|+0	`A * B=\left(\begin{array}{ll} 0 & 1 \\ 0 & 0 \end{array}\right) *\left(\begin{array}{ll} 0 & 1 \\ 1 & 0 \end{array}\right) \neq\left(\begin{array}{ll} 0 & 1 \\ 1 & 0 \end{array}\right) *\left(\begin{array}{ll} 0 & 1 \\ 0 & 0 \end{array}\right)=B * A .`	$A * B=\left(\begin{array}{ll} 0 & 1 \\ 0 & 0 \end{array}\right) *\left(\begin{array}{ll} 0 & 1 \\ 1 & 0 \end{array}\right) \neq\left(\begin{array}{ll} 0 & 1 \\ 1 & 0 \end{array}\right) *\left(\begin{array}{ll} 0 & 1 \\ 0 & 0 \end{array}\right)=B * A .$	$A * B=\left(\begin{array}{ll} 0 & 1 \\ 0 & 0 \end{array}\right) *\left(\begin{array}{ll} 0 & 1 \\ 1 & 0 \end{array}\right) \neq\left(\begin{array}{ll} 0 & 1 \\ 1 & 0 \end{array}\right) *\left(\begin{array}{ll} 0 & 1 \\ 0 & 0 \end{array}\right)=B * A .$
fong-spivak-invitation_EQ0236	312	■1.000 ● K|+0	`\left(\begin{array}{lll} 1 & 1 & 1 \end{array}\right)`	$\left(\begin{array}{lll} 1 & 1 & 1 \end{array}\right)$	$\left(\begin{array}{lll} 1 & 1 & 1 \end{array}\right)$
fong-spivak-invitation_EQ0237	312	■1.000 ● K|+0	`\left(\begin{array}{lll} 1 & 1 & 1 \end{array}\right)`	$\left(\begin{array}{lll} 1 & 1 & 1 \end{array}\right)$	$\left(\begin{array}{lll} 1 & 1 & 1 \end{array}\right)$
fong-spivak-invitation_EQ0238	313	■1.000 ● K|+0	`g_{1}:=c_{n}+\cdots+c_{n}: m \rightarrow(m \times n),`	$g_{1}:=c_{n}+\cdots+c_{n}: m \rightarrow(m \times n),$	$g_{1}:=c_{n}+\cdots+c_{n}: m \rightarrow(m \times n),$
fong-spivak-invitation_EQ0240	313	■1.000 ● N|+0	`\begin{aligned} g_{2}:= & s_{M(1,1)}+\cdots+s_{M(1, n)} \\ & +s_{M(2,1)}+\cdots+s_{M(2, n)} \\ & +\cdots \\ & +s_{M(m, 1)}+\cdots+s_{M(m, n)}:(m \times n) \rightarrow(m \times n), \end{aligned}`	$\begin{aligned} g_{2}:= & s_{M(1,1)}+\cdots+s_{M(1,n)} \\ & +s_{M(2,1)}+\cdots+s_{M(2,n)} \\ & +\cdots \\ & +s_{M(m,1)}+\cdots+s_{M(m,n)}:(m \times n) \rightarrow(m \times n), \end{aligned}$	$\begin{aligned} g_{2}:= & s_{M(1,1)}+\cdots+s_{M(1,n)} \\ & +s_{M(2,1)}+\cdots+s_{M(2,n)} \\ & +\cdots \\ & +s_{M(m,1)}+\cdots+s_{M(m,n)}:(m \times n) \rightarrow(m \times n), \end{aligned}$
fong-spivak-invitation_EQ0241	313	■1.000 ● K|+0	`g_{4}:=a_{m}+\cdots+a_{m}:(m \times n) \rightarrow n,`	$g_{4}:=a_{m}+\cdots+a_{m}:(m \times n) \rightarrow n,$	$g_{4}:=a_{m}+\cdots+a_{m}:(m \times n) \rightarrow n,$
fong-spivak-invitation_EQ0243	315	■1.000 ● K|+0	`\mu:=\left(\begin{array}{ll} 1 & 0 \\ 0 & 1 \\ 1 & 0 \\ 0 & 1 \end{array}\right)`	$\mu:=\left(\begin{array}{ll} 1 & 0 \\ 0 & 1 \\ 1 & 0 \\ 0 & 1 \end{array}\right)$	$\mu:=\left(\begin{array}{ll} 1 & 0 \\ 0 & 1 \\ 1 & 0 \\ 0 & 1 \end{array}\right)$
fong-spivak-invitation_EQ0244	315	■1.000 ● N|+0	`U(\mu)\left(\left(a_{1}, \ldots, a_{m}\right), \left(b_{1}, \ldots, b_{m}\right)\right):= \left(a_{1}+b_{1}, \ldots, a_{m}+b_{m}\right) .`	$U(\mu)\left(\left(a_{1}, \ldots, a_{m}\right), \left(b_{1}, \ldots, b_{m}\right)\right):= \left(a_{1}+b_{1}, \ldots, a_{m}+b_{m}\right) .$	$U(\mu)\left(\left(a_{1}, \ldots, a_{m}\right), \left(b_{1}, \ldots, b_{m}\right)\right):= \left(a_{1}+b_{1}, \ldots, a_{m}+b_{m}\right) .$
fong-spivak-invitation_EQ0246	316	■1.000 ● W|-1	`\begin{aligned} \mathrm{B}(g) & =\left\{(x, z) \in R^{m} \times R^{n} \mid S(g)(x)=z\right\}, \\ \mathrm{B} \left(h^{\mathrm{op}}\right) & =\left\{(z, y) \in R^{n} \times R^{\ell} \mid z=S(h)(y)\right\}, \end{aligned}`	$\begin{aligned} \mathrm{B}(g) & =\left\{(x, z) \in R^{m} \times R^{n} \mid S(g)(x)=z\right\}, \\ \mathrm{B} \left(h^{\mathrm{op}}\right) & =\left\{(z, y) \in R^{n} \times R^{\ell} \mid z=S(h)(y)\right\}, \end{aligned}$	$\begin{aligned} \mathrm{B}(g) & =\left\{(x, z) \in R^{m} \times R^{n} \mid S(g)(x)=z\right\}, \\ \mathrm{B} \left(h^{\mathrm{op}}\right) & =\left\{(z, y) \in R^{n} \times R^{\ell} \mid z=S(h)(y)\right\}, \end{aligned}$
fong-spivak-invitation_EQ0249	316	■1.000 ● W|-1	`\begin{aligned} \mathrm{B}\left(g^{\mathrm{op}}\right) & =\left\{(y, x) \in R^{n} \times R^{m} \mid y=S(g)(x) \right\}, \\ \mathrm{B}(h) & =\left\{(x, z) \in R^{m} \times R^{p} \mid S(h)(x)=z\right\}, \end{aligned}`	$\begin{aligned} \mathrm{B}\left(g^{\mathrm{op}}\right) & =\left\{(y, x) \in R^{n} \times R^{m} \mid y=S(g)(x) \right\}, \\ \mathrm{B}(h) & =\left\{(x, z) \in R^{m} \times R^{p} \mid S(h)(x)=z\right\}, \end{aligned}$	$\begin{aligned} \mathrm{B}\left(g^{\mathrm{op}}\right) & =\left\{(y, x) \in R^{n} \times R^{m} \mid y=S(g)(x) \right\}, \\ \mathrm{B}(h) & =\left\{(x, z) \in R^{m} \times R^{p} \mid S(h)(x)=z\right\}, \end{aligned}$
fong-spivak-invitation_EQ0251	316	■1.000 ● N|+1	`\mathrm{B}\left(\left(g^{\mathrm{op}}\right) ; h\right)= \left\{(S(g)(x), S(h)(x)) \mid x \in R^{m}\right\} .`	$\mathrm{B}\left(\left(g^{\mathrm{op}}\right) ; h\right)=\left\{(S(g)(x), S(h)(x)) \mid x \in R^{m}\right\} .$	$\mathrm{B}\left(\left(g^{\mathrm{op}}\right) ; h\right)=\left\{(S(g)(x), S(h)(x)) \mid x \in R^{m}\right\} .$

Conf. MathPix confidence: ■ ≥0.9 ■ 0.5–0.9 ■ <0.5 — no value
Residual render vs scan (inkdrill): ● C component ● W weak ● S stable ● N noise ● K clean ● not measured

Identifier	Page	Conf.	LaTeX source	Rendered	Scan image
fong-spivak-invitation_ EQ0252	318	■ 1.000 ● C|-12	`f(m)=f(\underbrace{1+1+\cdots+1}_{m \text { summands }})= \underbrace{f(1)+f(1)+\cdots+f(1)}_{m \text { summands }}=\underbrace{1_{R}+1_{R}+\cdots+1_{R}}_{m \text { summands }} .`	$f(m)=f(\underbrace{1+1+\cdots+1}_{m \text{ summands}})=\underbrace{f(1)+f(1)+\cdots+f(1)}_{m \text{ summands}}=\underbrace{1_R+1_R+\cdots+1_R}_{m \text{ summands}}.$	$f(m)=f(\underbrace{1+1+\cdots+1}_{m \text{ summands}})=\underbrace{f(1)+f(1)+\cdots+f(1)}_{m \text{ summands}}=\underbrace{1_R+1_R+\cdots+1_R}_{m \text{ summands}}.$
fong-spivak-invitation_ EQ0254	318	■ 1.000 ● N|+0	`\begin{aligned} {[f, g]: A \sqcup B } & \longrightarrow T \\ \text { apple } 1 & \longmapsto a \end{aligned}`	$\begin{aligned} {[f, g]: A \sqcup B } &\longrightarrow T \\ \text { apple } 1 &\longmapsto a \end{aligned}$	$\begin{aligned} {[f, g]: A \sqcup B } &\longrightarrow T \\ \text { apple} 1 &\longmapsto a \end{aligned}$
fong-spivak-invitation_ EQ0261	338	■ 1.000 ● K|+0	`U=\bigcup_{i \in I}\left\{x \in \mathbb{R} \mid a_{i}<x<b_{i}\right\}`	$U=\bigcup_{i \in I}\left\{x \in \mathbb{R} \mid a_{i}<x<b_{i}\right\}$	$U=\bigcup_{i \in I}\left\{x \in \mathbb{R} \mid a_{i}<x<b_{i}\right\}$
fong-spivak-invitation_ EQ0262	338	■ 1.000 ● K|+0	`U=\bigcup_{j \in J}\left\{x \in \mathbb{R} \mid a_{j}<x<b_{j}\right\}=\bigcup_{j \in J}\left(o_{ \left[a_{j}, b_{j}\right]} \cap \mathbb{R}\right)=\left( \bigcup_{j \in J} o_{\left[a_{j}, b_{j}\right]}\right) \cap \mathbb{R}`	$U=\bigcup_{j \in J}\left\{x \in \mathbb{R} \mid a_{j}<x<b_{j}\right\}=\bigcup_{j \in J}\left(o_{\left[a_{j}, b_{j}\right]} \cap \mathbb{R}\right)=\left(\bigcup_{j \in J} o_{\left[a_{j}, b_{j}\right]}\right) \cap \mathbb{R}$	$U=\bigcup_{j \in J}\left\{x \in \mathbb{R} \mid a_{j}<x<b_{j}\right\}=\bigcup_{j \in J}\left(o_{\left[a_{j}, b_{j}\right]} \cap \mathbb{R}\right)=\left(\bigcup_{j \in J} o_{\left[a_{j}, b_{j}\right]}\right) \cap \mathbb{R}$
fong-spivak-invitation_ EQ0064	114	— ● C|+31	—	—	$G :=$ $\boxed{\overset{1}{\bullet} \xrightarrow{a} \overset{2}{\bullet} \xrightarrow{b} \overset{3}{\bullet}}$ $H :=$ $\overset{4}{\bullet} \underset{c}{\overset{d}{\rightrightarrows}} \overset{5}{\bullet} \circlearrowleft e$
fong-spivak-invitation_ EQ0065	114	— ● C|+77	—	—	$G :=$ **Arrow** | **source** | **target**: a | 1 | 2; b | 2 | 3. **Vertex**: 1, 2, 3. $H :=$ **Arrow** | **source** | **target**: c | 4 | 5; d | 4 | 5; e | 5 | 5. **Vertex**: 4, 5.

Conf. MathPix confidence: ■ ≥0.9 ■ 0.5–0.9 ■ <0.5 — no value
Residual render vs scan (inkdrill): ● C component ● W weak ● S stable ● N noise ● K clean ● not measured

Tables

Identifier	Page	Conf.	LaTeX source	Rendered	Scan image
fong-spivak-invitation_Table_001	028	—	(no LaTeX source; 702 × 280 px region)	—	**Arrow** a || **source** $s(a) \in V$ || **target** $t(a) \in V$ a || 1 || ? b || 1 || 3 c || ? || ? d || ? || ? e || ? || ?
fong-spivak-invitation_Table_002	065	—	(no LaTeX source; 834 × 144 px region)	—	$\wedge$ | false true false | false false true | false true $*$ | 0 1 0 | 0 0 1 | 0 1
fong-spivak-invitation_Table_003	066	—	(no LaTeX source; 406 × 144 px region)	—	$\vee$ | false true false | false true true | true true
fong-spivak-invitation_Table_004	066	—	(no LaTeX source; 208 × 146 px region)	—	max | 0 1 0 | 0 1 1 | 1 1
fong-spivak-invitation_Table_005	066	—	(no LaTeX source; 458 × 186 px region)	—	min | no maybe yes no | ? ? ? maybe | ? ? ? yes | ? ? ?
fong-spivak-invitation_Table_006	071	—	(no LaTeX source; 778 × 278 px region)	—	$\cdot \leq \cdot$ | p q r s t p | true true true true true q | false true false true true r | false false true true true s | false false false true true t | false false false false true
fong-spivak-invitation_Table_007	075	—	(no LaTeX source; 284 × 190 px region)	—	$d(\nearrow)$ | x y z x | 0 4 3 y | 3 0 6 z | 7 4 0
fong-spivak-invitation_Table_008	075	—	(no LaTeX source; 368 × 234 px region)	—	$d(\nearrow)$ | A B C D A | 0 ? ? ? B | 2 ? 5 ? C | ? ? ? ? D | ? ? ? ?
fong-spivak-invitation_Table_009	076	—	(no LaTeX source; 432 × 232 px region)	—	$M_X =$ $\nearrow$ | A B C D A | 0 ? ? ? B | 2 0 ∞ ? C | ? ? ? ? D | ? ? ? ?
fong-spivak-invitation_Table_010	081	—	(no LaTeX source; 272 × 190 px region)	—	$\mathcal{X}$ | A B C A | 0 2 5 B | ∞ 0 3 C | ∞ ∞ 0

Conf. MathPix confidence: ■ ≥0.9 ■ 0.5–0.9 ■ <0.5 — no value

Residual render vs scan (inkdrill): • C component • W weak • S stable • N noise • K clean • not measured

Identifier	Page	Conf.	LaTeX source	Rendered	Scan image
fong-spivak-invitation_Table_1	081	—	(no LaTeX source; 178 × 148 px region)	—	$\begin{array}{c\|cc} \mathcal{Y} & p & q \\ \hline p & 0 & 5 \\ q & 8 & 0 \end{array}$
fong-spivak-invitation_Table_2	081	—	(no LaTeX source; 890 × 336 px region)	—	$\begin{array}{c\|\|ccc\|ccc} \mathcal{X} \times \mathcal{Y} & (A,p) & (B,p) & (C,p) & (A,q) & (B,q) & (C,q) \\ \hline\hline (A,p) & 0 & 2 & 5 & 5 & 7 & 10 \\ (B,p) & \infty & 0 & 3 & \infty & 5 & 8 \\ (C,p) & \infty & \infty & 0 & \infty & \infty & 5 \\ \hline (A,q) & 8 & 10 & 13 & 0 & 2 & 5 \\ (B,q) & \infty & 8 & 11 & \infty & 0 & 3 \\ (C,q) & \infty & \infty & 8 & \infty & \infty & 0 \end{array}$
fong-spivak-invitation_Table_3	088	—	(no LaTeX source; 300 × 224 px region)	—	$\begin{array}{c\|ccc} M_Y & x & y & z \\ \hline x & 0 & 4 & 3 \\ y & 3 & 0 & \infty \\ z & \infty & 4 & 0 \end{array}$
fong-spivak-invitation_Table_4	088	—	(no LaTeX source; 256 × 224 px region)	—	$\begin{array}{c\|ccc} d_Y & x & y & z \\ \hline x & 0 & 4 & 3 \\ y & 3 & 0 & 6 \\ z & 7 & 4 & 0 \end{array}$
fong-spivak-invitation_Table_5	088	—	(no LaTeX source; 334 × 190 px region)	—	$M_Y^2 = \begin{array}{c\|ccc} \nearrow & x & y & z \\ \hline x & 0 & 4 & 3 \\ y & 3 & 0 & 6 \\ z & 7 & 4 & 0 \end{array}$
fong-spivak-invitation_Table_6	088	—	(no LaTeX source; 334 × 190 px region)	—	$M_Y^3 = \begin{array}{c\|ccc} \nearrow & x & y & z \\ \hline x & 0 & 4 & 3 \\ y & 3 & 0 & 6 \\ z & 7 & 4 & 0 \end{array}$
fong-spivak-invitation_Table_7	091	—	(no LaTeX source; 640 × 188 px region)	—	**Employee** | **FName** | **WorksIn** | **Mngr** 1 | Alan | 101 | 2 2 | Ruth | 101 | 2 3 | Kris | 102 | 3
fong-spivak-invitation_Table_8	091	—	(no LaTeX source; 490 × 188 px region)	—	**Department** | **DName** | **Secr** 101 | Sales | 1 102 | IT | 3
fong-spivak-invitation_Table_9	104	—	(no LaTeX source; 1038 × 432 px region)	—	**Planet of Sol** | **Prime number** | **Flying pig** Mercury | 2 Venus | 3 Earth | 5 Mars | 7 Jupiter | 11 Saturn | 13 Uranus | 17 Neptune | ⋮

Conf. MathPix confidence: ■ ≥0.9 ■ 0.5–0.9 ■ <0.5 — no value
Residual render vs scan (inkdrill): • C component • W weak • S stable • N noise • K clean • not measured

Identifier	Page	Conf.	LaTeX source	Rendered	Scan image
fong-spivak-invitation_TAB_024	104	—	(no LaTeX source; 382 × 232 px region)	—	**Beatle** | **Played** George | lead guitar John | rhythm guitar Paul | bass guitar Ringo | drums
fong-spivak-invitation_TAB_025	105	—	(no LaTeX source; 382 × 278 px region)	—	**Beatle** | **Played** George | lead guitar John | rhythm guitar Paul | bass guitar Ringo | drums
fong-spivak-invitation_TAB_026	105	—	(no LaTeX source; 428 × 276 px region)	—	**Rock-and-roll instrument** bass guitar drums keyboard lead guitar rhythm guitar
fong-spivak-invitation_TAB_027	109	—	(no LaTeX source; 426 × 454 px region)	—	$\mathbb{N}_{\geq 2}$ | **Smallest prime factor** 2 | 2 3 | 3 4 | 2 ⋮ | ⋮ 49 | 7 50 | 2 51 | 3 ⋮ | ⋮
fong-spivak-invitation_TAB_028	113	—	(no LaTeX source; 806 × 280 px region)	—	**Arrow** | **source** | **target** a | 1 | 2 b | 1 | 3 c | 1 | 3 d | 2 | 2 e | 2 | 3 **Vertex** 1 2 3 4
fong-spivak-invitation_TAB_029	115	—	(no LaTeX source; 216 × 368 px region)	—	**State** | **next** 1 | 4 2 | 4 3 | 5 4 | 5 5 | 5 6 | 7 7 | 6
fong-spivak-invitation_TAB_030	116	—	(no LaTeX source; 804 × 368 px region)	—	**Arrow** | **source** | **target** 1 | 1 | 4 2 | 2 | 4 3 | 3 | 5 4 | 4 | 5 5 | 5 | 5 6 | 6 | 7 7 | 7 | 6 **Vertex** 1 2 3 4 5 6 7

Conf. MathPix confidence: ■ ≥0.9 ■ 0.5–0.9 ■ <0.5 — no value
Residual render vs scan (inkdrill): • C component • W weak • S stable • N noise • K clean • not measured

Identifier	Page	Conf.	LaTeX source	Rendered	Scan image
fong-spivak-invitation_TAB_20	120	—	(no LaTeX source; 1158 × 278 px region)	—	**Migration functor** | **pronounced** | **reminiscent of** | **database idea** Δ | delta | duplicate or destroy | duplicate or destroy tables or columns Σ | sigma | sum | union (sum up) data Π | pi | product | pair[9] and query data
fong-spivak-invitation_TAB_21	121	—	(no LaTeX source; 922 × 324 px region)	—	**Email** | **sent_by** | **received_by** Em_1 | Bob | Grace Em_2 | Grace | Pat Em_3 | Bob | Emmy Em_4 | Sue | Doug Em_5 | Doug | Sue Em_6 | Bob | Bob **Address** Bob Doug Emmy Grace Pat Sue
fong-spivak-invitation_TAB_23	133	—	(no LaTeX source; 536 × 140 px region)	—	**Bool**-category | preorder **Bool**-functor | monotone map **Bool**-profunctor | feasibility relation
fong-spivak-invitation_TAB_24	134	—	(no LaTeX source; 426 × 234 px region)	—	c | d | $c \Rightarrow d$ true | true | true true | false | false false | true | true false | false | true
fong-spivak-invitation_TAB_26	136	—	(no LaTeX source; 588 × 288 px region)	—	Φ | a | b | c | d | e N | ? | ? | ? | ? | true E | true | ? | ? | ? | ? W | ? | ? | ? | false | ? S | ? | ? | ? | ? | ?
fong-spivak-invitation_TAB_35	137	—	(no LaTeX source; 280 × 232 px region)	—	Φ | x | y | z A | ? | ? | 20 B | 11 | ? | ? C | ? | 17 | ? D | ? | ? | ?
fong-spivak-invitation_TAB_33	137	—	(no LaTeX source; 362 × 234 px region)	—	M_X | A | B | C | D A | 0 | ∞ | 3 | ∞ B | 2 | 0 | ∞ | 5 C | ∞ | 3 | 0 | ∞ D | ∞ | ∞ | 4 | 0
fong-spivak-invitation_TAB_34	137	—	(no LaTeX source; 276 × 232 px region)	—	M_Φ | x | y | z A | ∞ | ∞ | ∞ B | 11 | ∞ | ∞ C | ∞ | ∞ | ∞ D | ∞ | 9 | ∞
fong-spivak-invitation_TAB_35	137	—	(no LaTeX source; 254 × 186 px region)	—	M_Y | x | y | z x | 0 | 4 | 3 y | 3 | 0 | ∞ z | ∞ | 4 | 0

Conf. MathPix confidence: ■ ≥0.9 ■ 0.5–0.9 ■ <0.5 — no value
Residual render vs scan (inkdrill): • C component • W weak • S stable • N noise • K clean • not measured

Identifier	Page	Conf.	LaTeX source	Rendered	Scan image
fong-spivak-invitation_TAB_40	140	—	(no LaTeX source; 698×236 px region)	—	$\begin{array}{c\|ccccc} \Phi & a & b & c & d & e \\ \hline N & \texttt{true} & \texttt{false} & \texttt{true} & \texttt{false} & \texttt{false} \\ E & \texttt{true} & \texttt{false} & \texttt{true} & \texttt{false} & \texttt{true} \\ W & \texttt{true} & \texttt{true} & \texttt{true} & \texttt{true} & \texttt{false} \\ S & \texttt{true} & \texttt{true} & \texttt{true} & \texttt{true} & \texttt{true} \end{array}$
fong-spivak-invitation_TAB_40	140	—	(no LaTeX source; 352×280 px region)	—	$\begin{array}{c\|cc} \Psi & x & y \\ \hline a & \texttt{false} & \texttt{true} \\ b & \texttt{true} & \texttt{true} \\ c & \texttt{false} & \texttt{true} \\ d & \texttt{true} & \texttt{true} \\ e & \texttt{false} & \texttt{false} \end{array}$
fong-spivak-invitation_TAB_40	140	—	(no LaTeX source; 384×232 px region)	—	$\begin{array}{c\|cc} \Phi \fatsemi \Psi & x & y \\ \hline N & \texttt{false} & \texttt{true} \\ E & \texttt{false} & \texttt{true} \\ W & \texttt{true} & \texttt{true} \\ S & \texttt{true} & \texttt{true} \end{array}$
fong-spivak-invitation_TAB_41	141	—	(no LaTeX source; 354×232 px region)	—	$\begin{array}{c\|cccc} \Phi \fatsemi \Psi & p & q & r & s \\ \hline A & ? & 24 & ? & ? \\ B & ? & ? & ? & ? \\ C & ? & ? & ? & ? \\ D & ? & ? & 9 & ? \end{array}$
fong-spivak-invitation_TAB_46	146	—	(no LaTeX source; 818×142 px region)	—	$\begin{array}{c\|cc} \mathcal{X} & A & B \\ \hline A & 0 & 2 \\ B & \infty & 0 \end{array}$ $\begin{array}{c\|cc} \Phi & x & y \\ \hline A & 5 & 8 \\ B & \infty & \infty \end{array}$ $\begin{array}{c\|cc} \mathcal{Y} & x & y \\ \hline x & 0 & 3 \\ y & 4 & 0 \end{array}$
fong-spivak-invitation_TAB_46	146	—	(no LaTeX source; 408×266 px region)	—	$\begin{array}{c\|cccc} \mathbf{Col}(\Phi) & A & B & x & y \\ \hline A & 0 & 2 & 5 & 8 \\ B & \infty & 0 & \infty & \infty \\ x & 0 & 0 & 0 & 3 \\ y & 0 & 0 & 4 & 0 \end{array}$
fong-spivak-invitation_TAB_49	179	—	(no LaTeX source; 604×144 px region)	—	$\begin{array}{c\|cc} & a & b \\ \hline x & 15 & 3 \\ y & 0 & 21 \end{array}$ $\begin{pmatrix} 15 & 3 \\ 0 & 21 \end{pmatrix}$
fong-spivak-invitation_TAB_49	179	—	(no LaTeX source; 714×408 px region)	—	$\begin{array}{c\|c\|c\|c} \text{Generator} & \text{Icon} & \text{Matrix} & \text{Arity} \\ \hline \text{amplify by } a \in R & \text{ } & (a) & 1 \to 1 \\ \text{add} & \text{ } & \begin{pmatrix} 1 \\ 1 \end{pmatrix} & 2 \to 1 \\ \text{zero} & \text{} & () & 0 \to 1 \\ \text{copy} & \text{ } & \begin{pmatrix} 1 & 1 \end{pmatrix} & 1 \to 2 \\ \text{discard} & \text{} & () & 1 \to 0 \end{array}$
fong-spivak-invitation_TAB_42	242	—	(no LaTeX source; 674×236 px region)	—	$\begin{array}{cc\|c} P & Q & \ulcorner(\texttt{true}, \texttt{true})\urcorner(P, Q) \\ \hline \texttt{true} & \texttt{true} & \texttt{true} \\ \texttt{true} & \texttt{false} & \texttt{false} \\ \texttt{false} & \texttt{true} & \texttt{false} \\ \texttt{false} & \texttt{false} & \texttt{false} \end{array}$

Conf. MathPix confidence: ■ ≥ 0.9 ■ 0.5–0.9 ■ < 0.5 — no value
Residual render vs scan (inkdrill): • C component • W weak • S stable • N noise • K clean • not measured

Identifier	Page	Conf.	LaTeX source	Rendered	Scan image
fong-spivak-invitation_TAB_242	242	—	(no LaTeX source; 434 × 236 px region)	—	
fong-spivak-invitation_TAB_243	243	—	(no LaTeX source; 656 × 236 px region)	—	
fong-spivak-invitation_TAB_273	273	—	(no LaTeX source; 648 × 272 px region)	—	
fong-spivak-invitation_TAB_280	280	—	(no LaTeX source; 794 × 550 px region)	—	
fong-spivak-invitation_TAB_283	283	—	(no LaTeX source; 464 × 174 px region)	—	
fong-spivak-invitation_TAB_285	285	—	(no LaTeX source; 362 × 218 px region)	—	
fong-spivak-invitation_TAB_285	285	—	(no LaTeX source; 432 × 214 px region)	—	
fong-spivak-invitation_TAB_285	285	—	(no LaTeX source; 680 × 214 px region)	—	
fong-spivak-invitation_TAB_286	286	—	(no LaTeX source; 326 × 176 px region)	—	

Scan image

P	Q	$P \vee Q$
true	true	true
true	false	true
false	true	true
false	false	false

P	Q	$P \wedge Q$	$P = (P \wedge Q)$
true	true	?	?
true	false	?	?
false	true	?	?
false	false	?	?

Arrow a	**Source** $s(a) \in V$	**Target** $t(a) \in V$
a	1	2
b	1	3
c	1	3
d	2	2
e	2	3

p	q	$f(p)$	$g(q)$	$f(p) \leq^? q$	$p \leq^? g(q)$	**Same?**
1	1	1	1	yes	yes	yes!
1	2	1	2	no	no	yes!
1	4	1	4	yes	yes	yes!
2	1	2	1	no	no	yes!
2	2	2	2	yes	yes	yes!
2	4	2	4	yes	yes	yes!
3.9	1	4	1	no	no	yes!
3.9	2	4	2	no	no	yes!
3.9	4	4	4	yes	yes	yes!
4	1	4	1	no	no	yes!
4	2	4	2	no	no	yes!
4	4	4	4	yes	yes	yes!

min	no	maybe	yes
no	no	no	no
maybe	no	maybe	maybe
yes	no	maybe	yes

$d(\nearrow)$	A	B	C	D
A	0	6	3	11
B	2	0	5	5
C	5	3	0	8
D	11	9	6	0

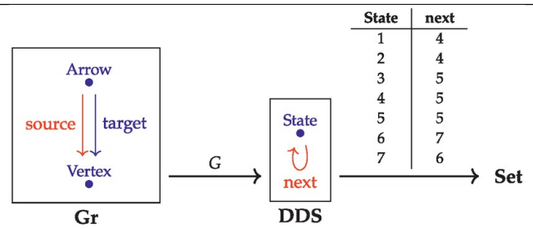
$M_X =$

$\nearrow$	A	B	C	D
A	0	∞	3	∞
B	2	0	∞	5
C	∞	3	0	∞
D	∞	∞	6	0

$\mathcal{X}(\nearrow)$	A	B	C	D
A	M	{boat}	$\varnothing$	{boat}
B	$\varnothing$	M	$\varnothing$	{boat}
C	{foot, boat}	{boat}	M	M
D	{foot}	$\varnothing$	{foot, car}	M

$M(\nearrow)$	A	B	C
A	∞	10	10
B	6	∞	6
C	10	10	∞

Conf. MathPix confidence: ■ ≥0.9 ■ 0.5–0.9 ■ <0.5 — no value
Residual render vs scan (inkdrill): • C component • W weak • S stable • N noise • K clean • not measured

Identifier	Page	Conf.	LaTeX source	Rendered	Scan image
fong-spivak-invitation_TA_288	288	—	(no LaTeX source; 374 × 134 px region)	—	$\Rightarrow$ | false true false | true true true | false true
fong-spivak-invitation_TA_290	290	—	(no LaTeX source; 694 × 300 px region)	—	$\nearrow$ | v_1 f_1 $f_1 \fatsemi f_2$ v_2 f_2 v_3 v_1 | v_1 f_1 $f_1 \fatsemi f_2$ ⊠ ⊠ ⊠ f_1 | ⊠ ⊠ ⊠ f_1 $f_1 \fatsemi f_2$ ⊠ $f_1 \fatsemi f_2$ | ⊠ ⊠ ⊠ ⊠ ⊠ $f_1 \fatsemi f_2$ v_2 | ⊠ ⊠ ⊠ v_2 f_2 ⊠ f_2 | ⊠ ⊠ ⊠ ⊠ ⊠ f_2 v_3 | ⊠ ⊠ ⊠ ⊠ ⊠ v_3
fong-spivak-invitation_TA_295	295	—	(no LaTeX source; 532 × 256 px region)	—	**Arrow** | **source** **target** Mngr | Employee Employee WorksIn | Employee Department Secr | Department Employee FName | Employee string DName | Department string
fong-spivak-invitation_TA_295	295	—	(no LaTeX source; 196 × 256 px region)	—	**Vertex** Department Employee string
fong-spivak-invitation_TA_296	296	—	(no LaTeX source; 826 × 354 px region)	—	
fong-spivak-invitation_TA_296	296	—	(no LaTeX source; 330 × 316 px region)	—	**Arrow** | **source** **target** 1 | 4 1 2 | 4 2 3 | 5 3 4 | 5 4 5 | 5 5 6 | 7 6 7 | 6 7
fong-spivak-invitation_TA_296	296	—	(no LaTeX source; 120 × 316 px region)	—	**Vertex** 1 2 3 4 5 6 7
fong-spivak-invitation_TA_297	297	—	(no LaTeX source; 872 × 298 px region)	—	**Email** | **sent_by** **received_by** Em_1 | Bob Grace Em_2 | Grace Pat Em_3 | Bob Emmy Em_4 | Sue Doug Em_5 | Doug Sue Em_6 | Bob Bob **Address** Bob Doug Emmy Grace Pat Sue

Conf. MathPix confidence: ■ ≥0.9 ■ 0.5–0.9 ■ <0.5 — no value

Residual render vs scan (inkdrill): • C component • W weak • S stable • N noise • K clean • not measured

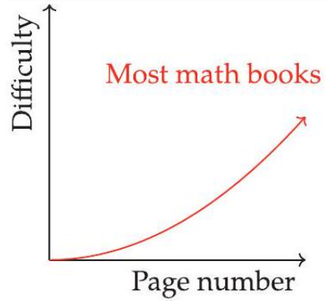
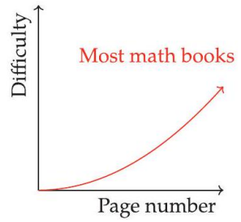
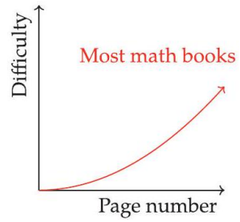
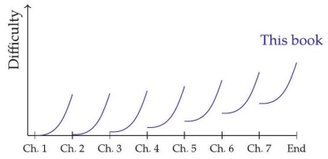
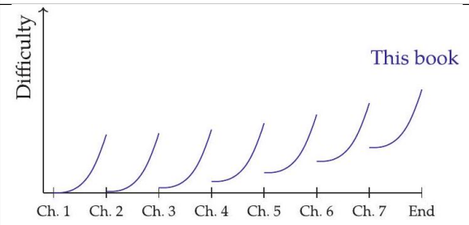
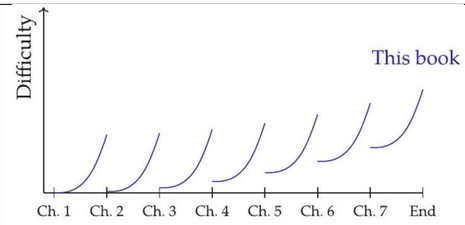
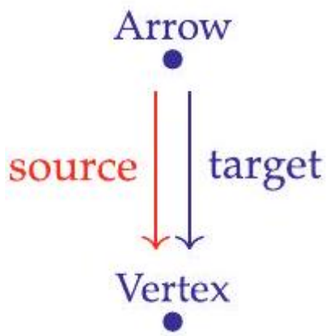
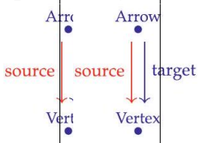
Identifier	Page	Conf.	LaTeX source	Rendered	Scan image
fong-spivak-invitation_TAB_000	300	—	(no LaTeX source; 656×216 px region)	—	$\begin{array}{c\|ccccc} \Phi & a & b & c & d & e \\ \hline N & \texttt{true} & \texttt{false} & \texttt{true} & \texttt{false} & \texttt{true} \\ E & \texttt{true} & \texttt{true} & \texttt{true} & \texttt{true} & \texttt{true} \\ W & \texttt{true} & \texttt{false} & \texttt{true} & \texttt{false} & \texttt{true} \\ S & \texttt{true} & \texttt{true} & \texttt{true} & \texttt{true} & \texttt{true} \end{array}$
fong-spivak-invitation_TAB_001	301	—	(no LaTeX source; 382×216 px region)	—	$\begin{array}{c\|cccc} \Phi \fatsemi \Psi & p & q & r & s \\ \hline A & 22 & 24 & 20 & 21 \\ B & 16 & 18 & 14 & 15 \\ C & 19 & 21 & 17 & 18 \\ D & 11 & 13 & 9 & 10 \end{array}$
fong-spivak-invitation_TAB_002	325	—	(no LaTeX source; 522×174 px region)	—	$\begin{array}{c\|ccccc} & \mathrm{r1} & \mathrm{r2} & \mathrm{r3} & \mathrm{c1} & \mathrm{i1} \\ \hline s(-) & \mathrm{dl} & \mathrm{ul} & \mathrm{ur} & \mathrm{ul} & \mathrm{dl} \\ t(-) & \mathrm{ul} & \mathrm{ur} & \mathrm{dr} & \mathrm{ur} & \mathrm{dr} \\ \ell(-) & 1\Omega & 2\Omega & 1\Omega & 3F & 1H \end{array}$
fong-spivak-invitation_TAB_003	325	—	(no LaTeX source; 246×134 px region)	—	$\begin{array}{c\|cc} & 1 & 2 \\ \hline f'(-) & \mathrm{l} & \mathrm{d} \\ g'(-) & \mathrm{r} & \mathrm{r} \end{array}$
fong-spivak-invitation_TAB_004	325	—	(no LaTeX source; 276×176 px region)	—	$\begin{array}{c\|cc} & \mathrm{r1}' & \mathrm{r2}' \\ \hline s(-) & \mathrm{l} & \mathrm{r} \\ t(-) & \mathrm{r} & \mathrm{d} \\ \ell(-) & 5\Omega & 8\Omega \end{array}$
fong-spivak-invitation_TAB_005	325	—	(no LaTeX source; 700×174 px region)	—	$\begin{array}{c\|ccccccc} & \mathrm{r1} & \mathrm{r2} & \mathrm{r3} & \mathrm{c1} & \mathrm{i1} & \mathrm{r1}' & \mathrm{r2}' \\ \hline s''(-) & \mathrm{dl} & \mathrm{ul} & \mathrm{m} & \mathrm{ul} & \mathrm{dl} & \mathrm{m} & \mathrm{r} \\ t''(-) & \mathrm{ul} & \mathrm{m} & \mathrm{dr} & \mathrm{m} & \mathrm{dr} & \mathrm{r} & \mathrm{m} \\ \ell''(-) & 1\Omega & 2\Omega & 1\Omega & 3F & 1H & 5\Omega & 8\Omega \end{array}$
fong-spivak-invitation_TAB_006	331	—	(no LaTeX source; 614×216 px region)	—	$\begin{array}{cc\|\|c\|c} P & Q & P \wedge Q & P = (P \wedge Q) \\ \hline \texttt{true} & \texttt{true} & \texttt{true} & \texttt{true} \\ \texttt{true} & \texttt{false} & \texttt{false} & \texttt{false} \\ \texttt{false} & \texttt{true} & \texttt{false} & \texttt{true} \\ \texttt{false} & \texttt{false} & \texttt{false} & \texttt{true} \end{array}$

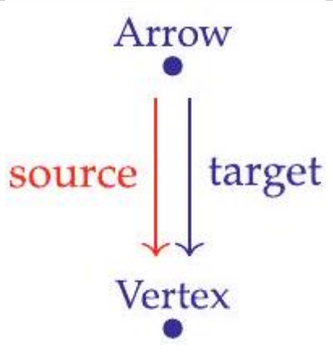
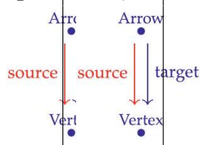
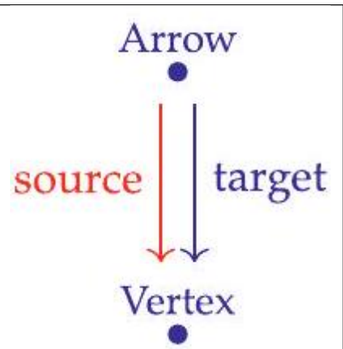
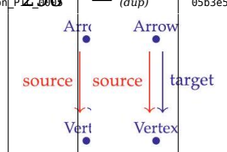
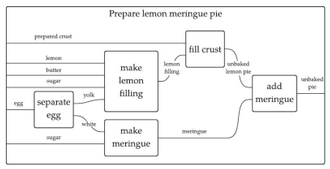
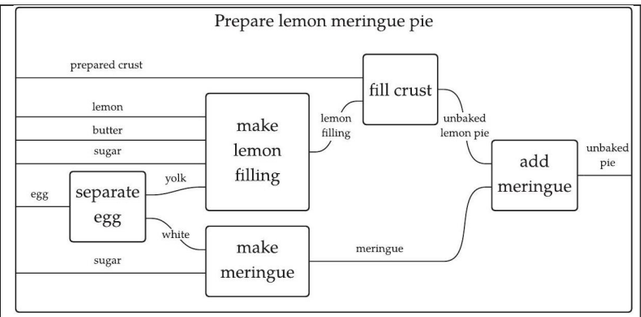
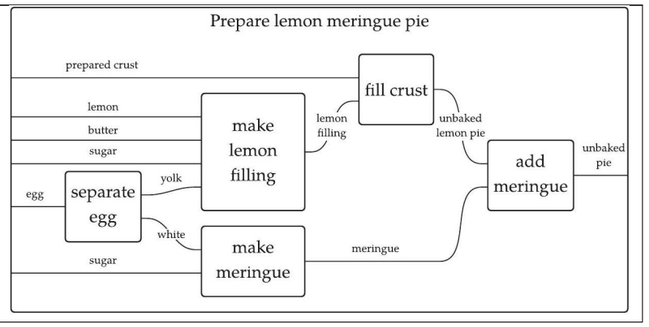
Conf. MathPix confidence: ■ ≥ 0.9 ■ 0.5–0.9 ■ < 0.5 — no value

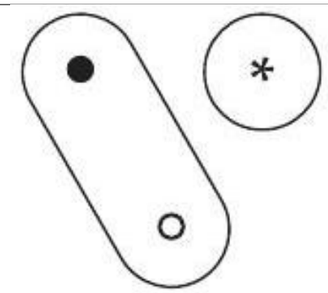
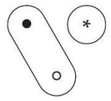
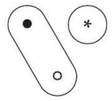
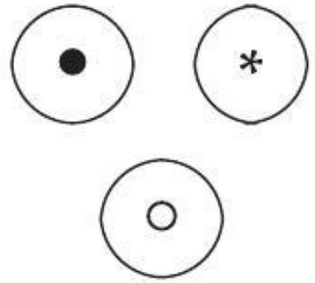
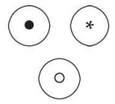
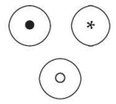
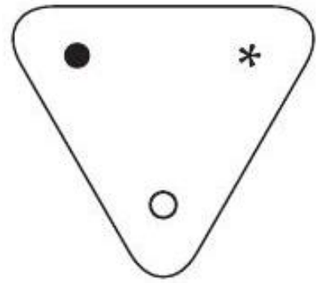
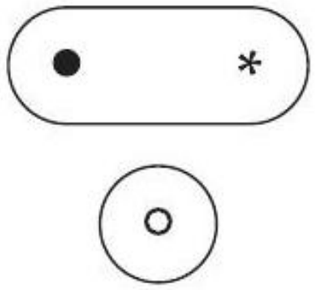
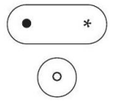
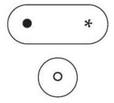
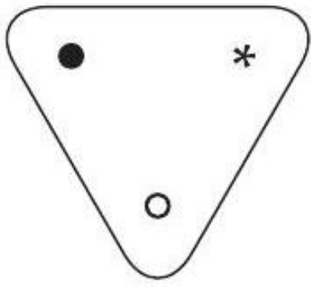
Residual render vs scan (inkdrill): • C component • W weak • S stable • N noise • K clean • not measured

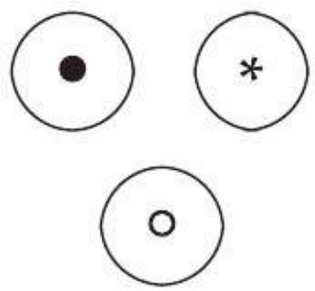
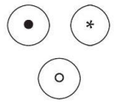
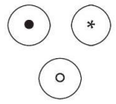
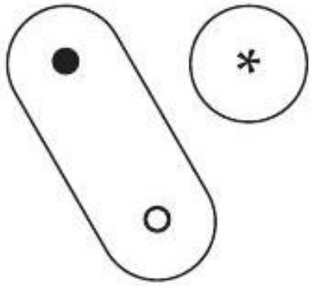
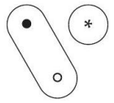
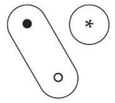
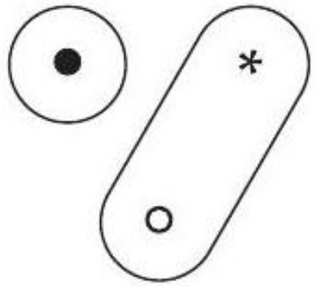
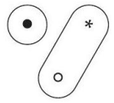
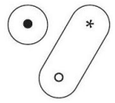
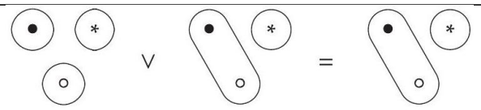
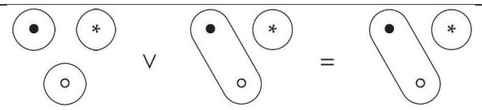
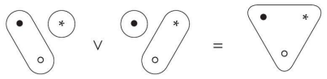
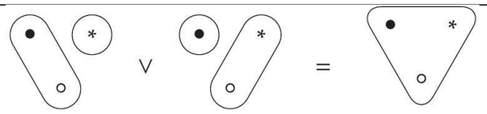
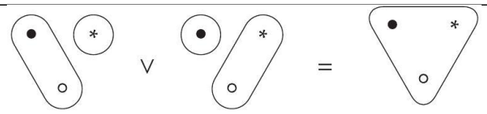
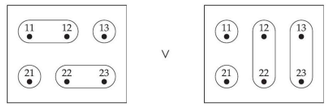
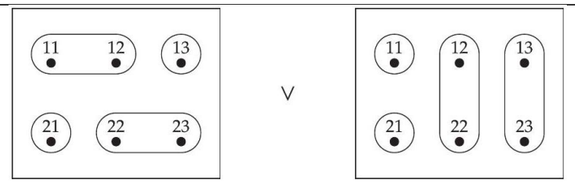
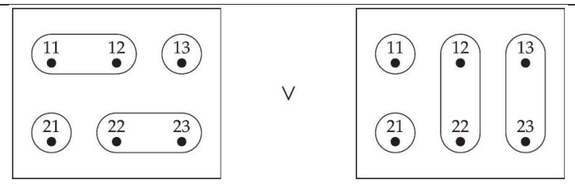
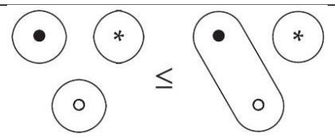
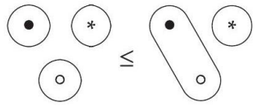
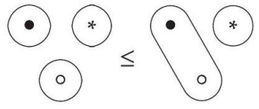
Image regions — rendered against scan

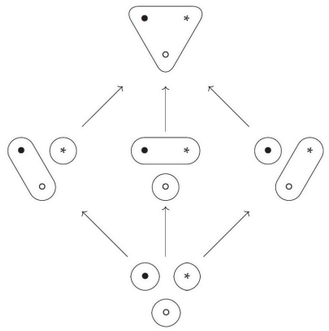
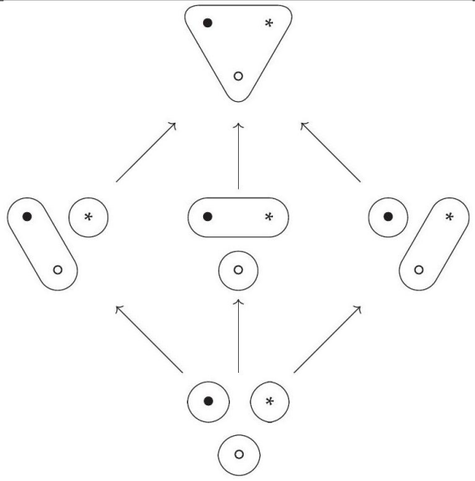
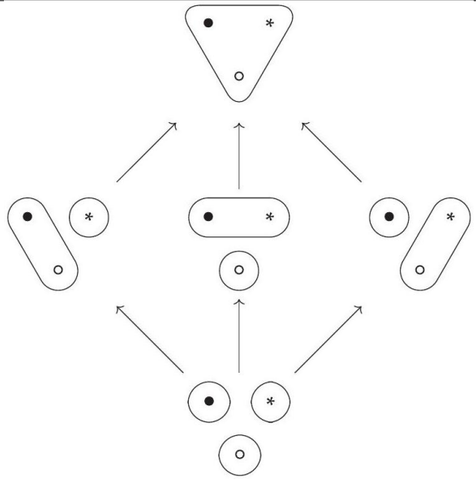
Two comparable cells per row. **Rendered**: the region's own LaTeX compiled as its OWN document, or — where no LaTeX exists — the scan again, so every row has two cells and the ink difference reads as a floor rather than as missing-versus-present. A duplicated row is marked *(dup)* and its distance is a SELF-comparison, not agreement between two sources. **Scan**: the `tex.zip` image whose filename region 5-tuple matches this row, else the CDN crop. The Class column carries the residual class beside MathPix's confidence, as the equation rows do. Setting a region's LaTeX does NOT say it renders to what is on the page — that is what the two columns are for, and 281 is the open question they exist to let a reader answer. A region with no LaTeX can be reconstructed with `pdfdrill vision`; verify any LLM result against the real ink with inkdrill.

Identifier	Page	Class	Source	Author source	Rendered	Scan
fong-spivak-invitation_PI_1001	013	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-013_350_370_1010_332.jpg			
fong-spivak-invitation_PI_1002	013	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-013_348_724_1012_822.jpg			
fong-spivak-invitation_PI_1003	296	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-296_214_198_1515_552.jpg			
contested: 4 rows *share this crop*						

fong-spivak-invitation_P1_0001	296	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-296_214_198_1515_552.jpg		
contested: 4 rows *share this crop*					
fong-spivak-invitation_P1_0001	296	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-296_214_198_1515_552.jpg		
contested: 4 rows *share this crop*					
fong-spivak-invitation_P1_0001	012	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-012_600_1206_502_338.jpg			

fong-spivak-invitation_D10_1002	016	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-016_152_168_1873_856.jpg			
fong-spivak-invitation_D10_1003	017	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-017_162_174_608_632.jpg			
fong-spivak-invitation_D10_1004	017	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-017_164_180_612_1064.jpg			
fong-spivak-invitation_D10_1005	017	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-017_158_170_1148_634.jpg			
fong-spivak-invitation_D10_1006	017	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-017_166_180_1148_1064.jpg			

fong-spivak-invitation_DIN_1007	017	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-017_162_176_1417_496.jpg			
fong-spivak-invitation_DIN_1008	017	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-017_158_172_1419_840.jpg			
fong-spivak-invitation_DIN_1009	017	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-017_160_172_1419_1180.jpg			
fong-spivak-invitation_DIN_1010	018	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-018_166_750_446_572.jpg			
fong-spivak-invitation_DIN_1011	018	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-018_172_760_688_560.jpg			
fong-spivak-invitation_DIN_1012	018	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-018_282_896_1072_492.jpg			
fong-spivak-invitation_DIN_1013	019	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-019_166_404_676_736.jpg			

fong-spivak-invitation_DIV_019	019	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-019_766_752_940_548.jpg			
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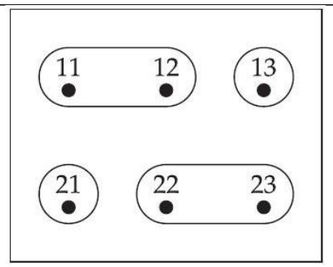
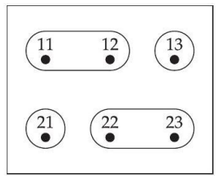
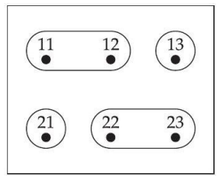
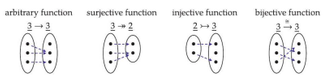
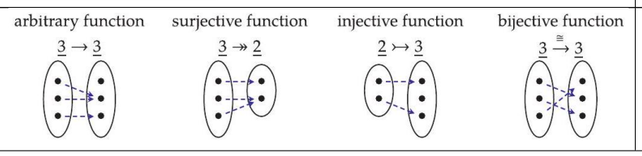
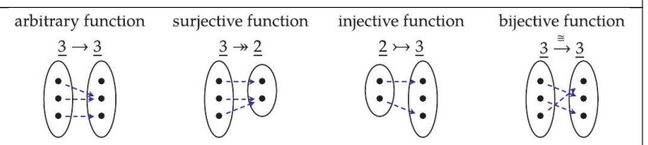
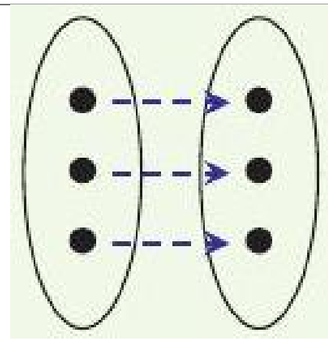
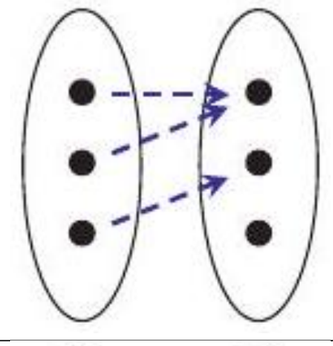
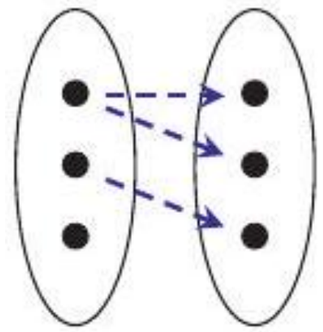
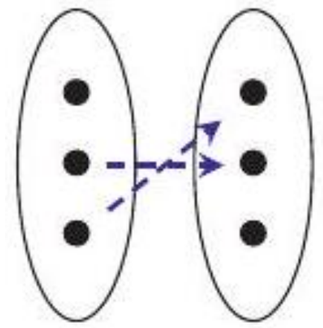
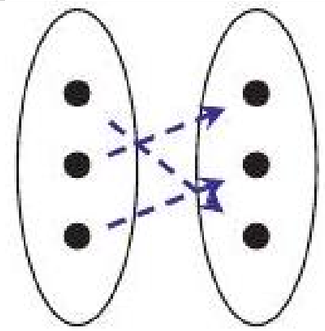
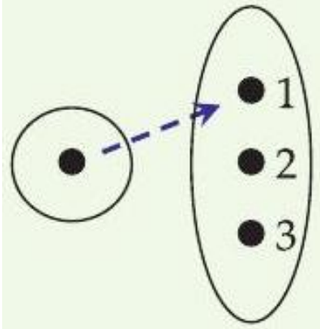
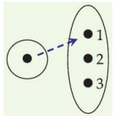
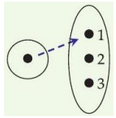
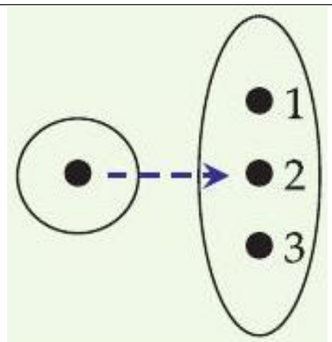
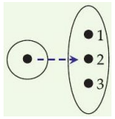
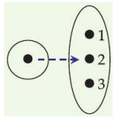
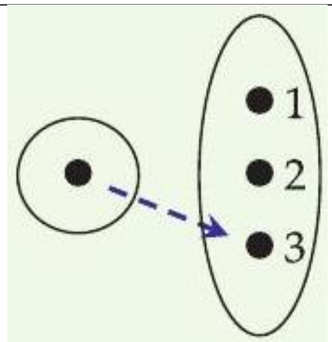
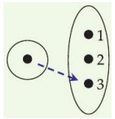
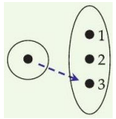
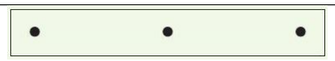
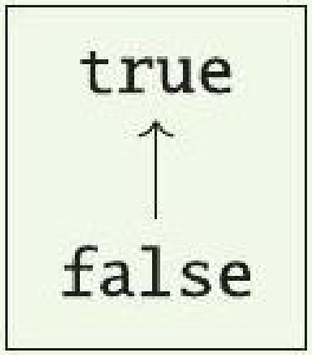
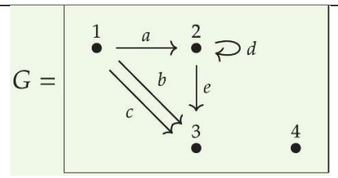
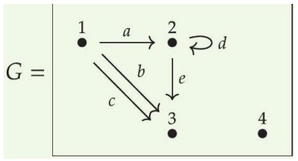
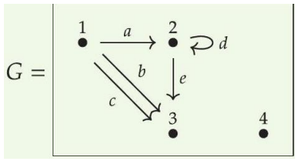
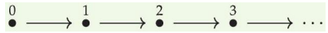
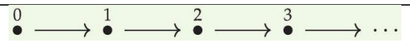
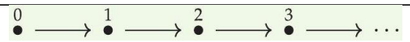
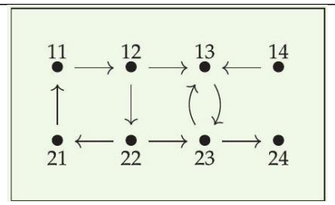
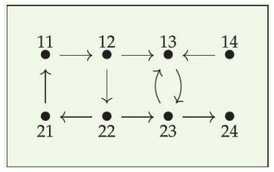
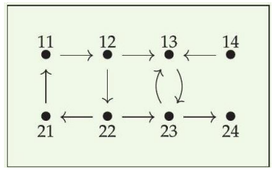
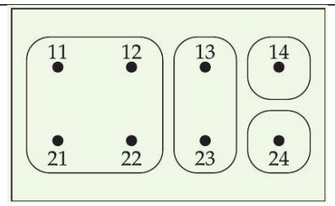
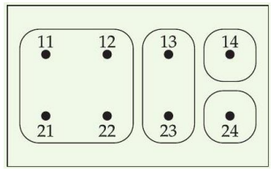
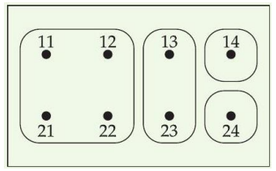
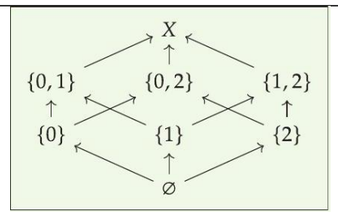
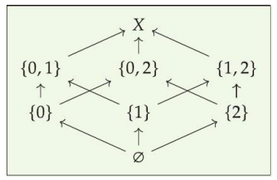
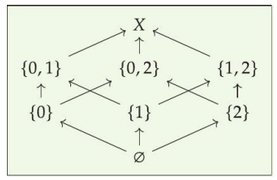
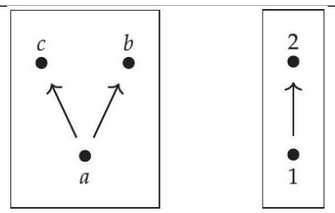
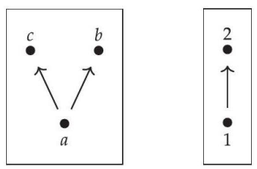
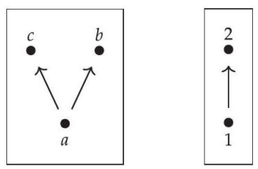
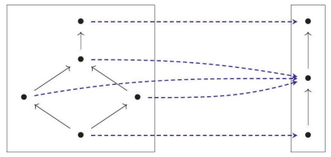
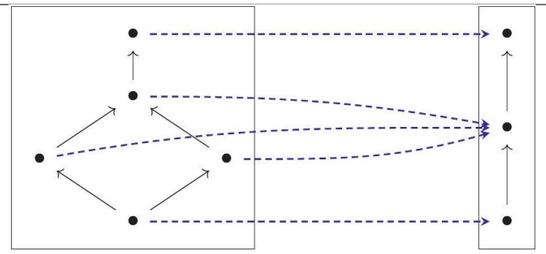
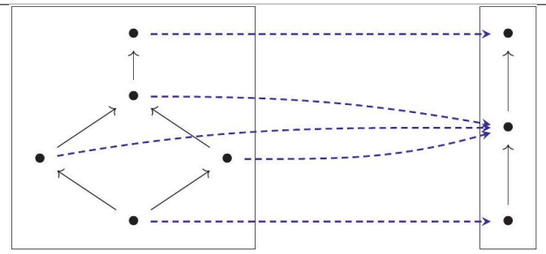
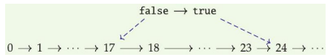
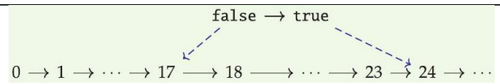
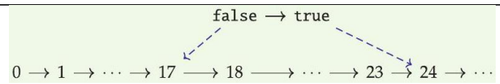
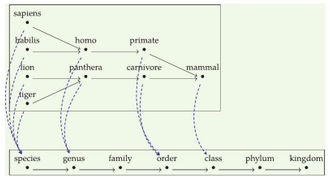
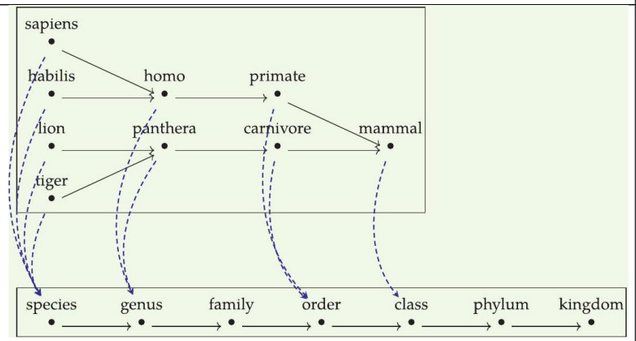
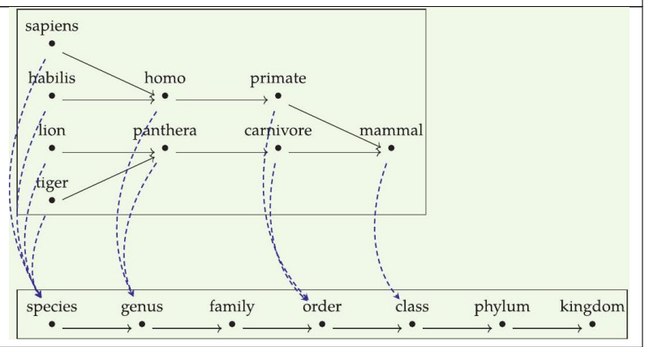
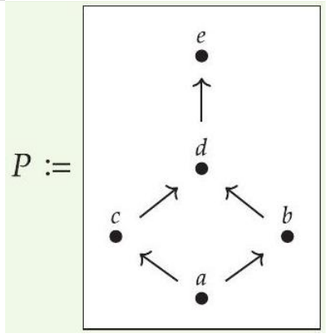
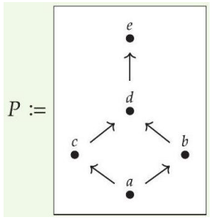
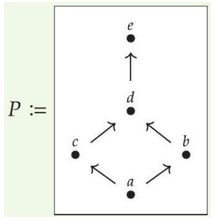
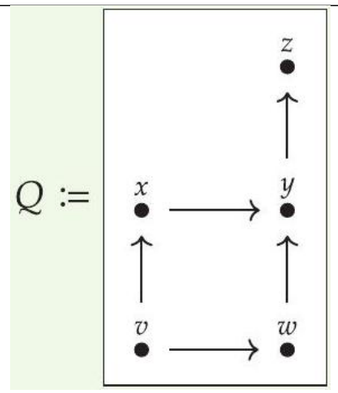
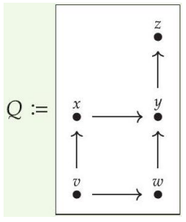
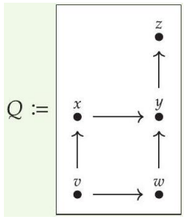
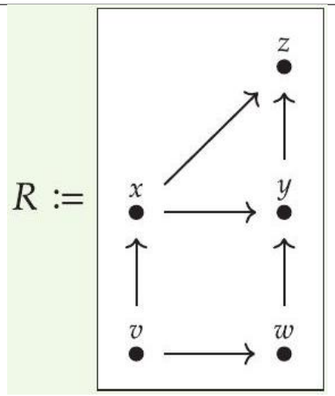
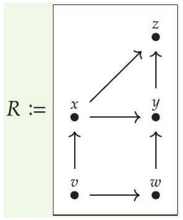
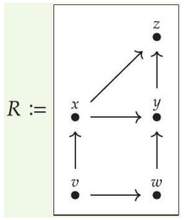
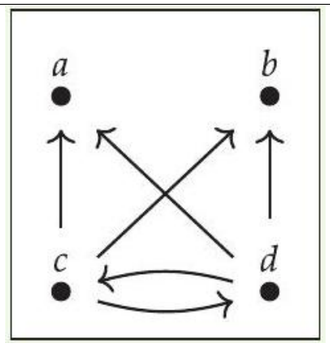
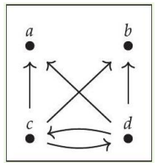
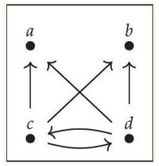
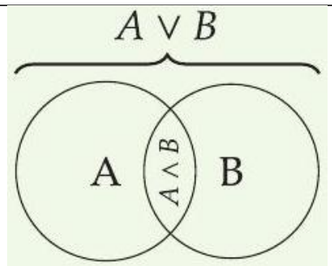
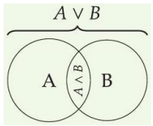
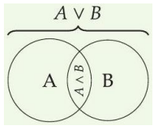
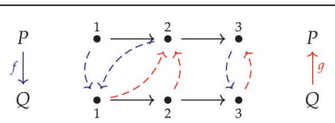
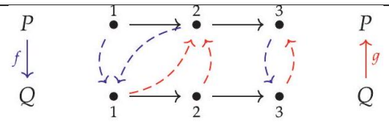
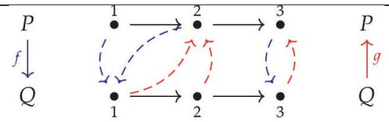
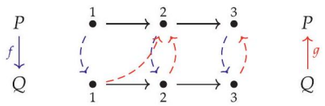
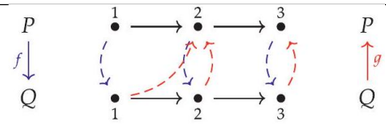
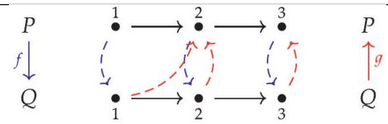
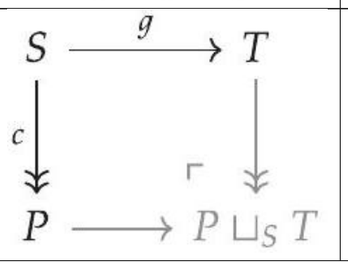
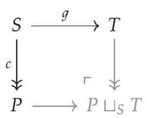
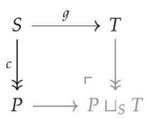
fong-spivak-invitation_DIV_023	023	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-023_276_340_1593_768.jpg			
fong-spivak-invitation_DIV_025	025	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-025_222_1022_944_426.jpg			

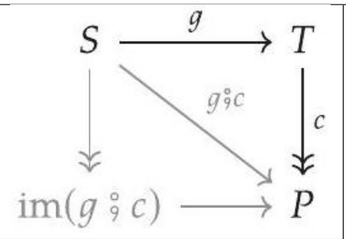
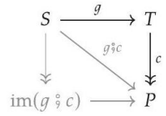
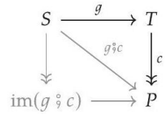
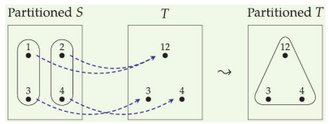
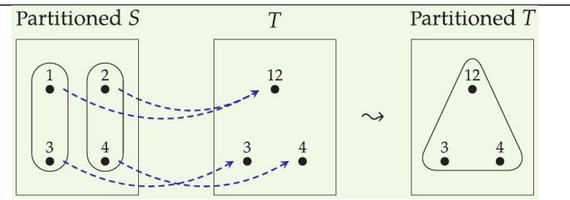
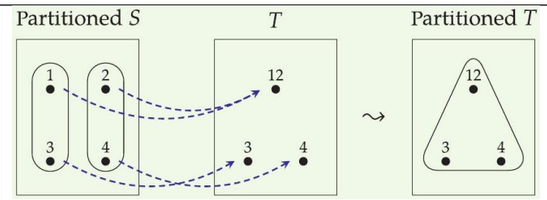
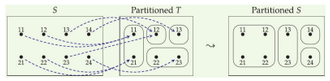
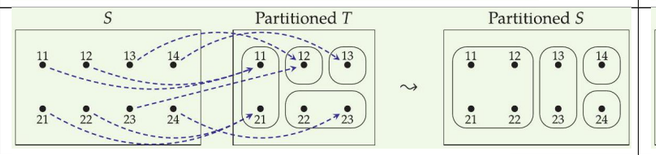
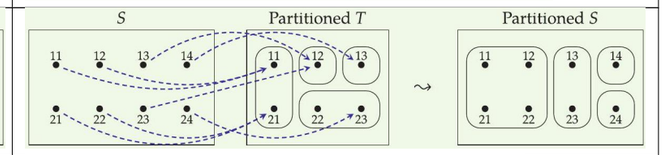
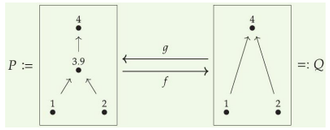
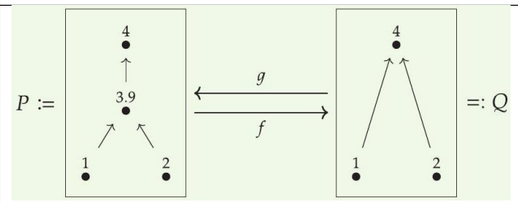
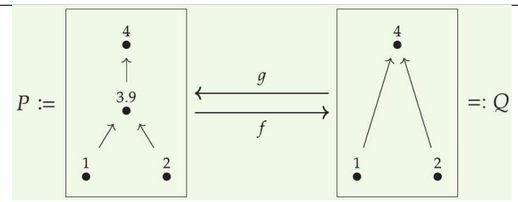
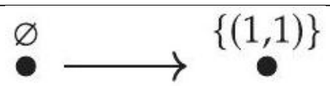
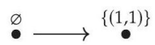
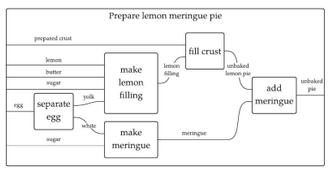
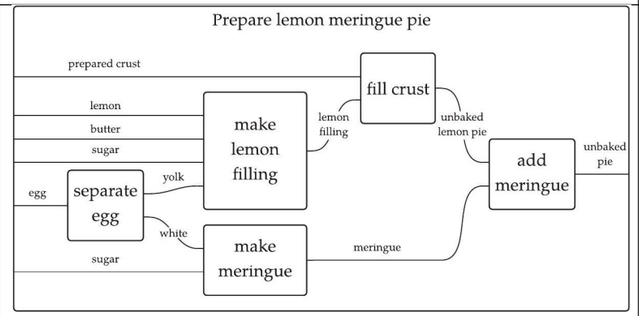
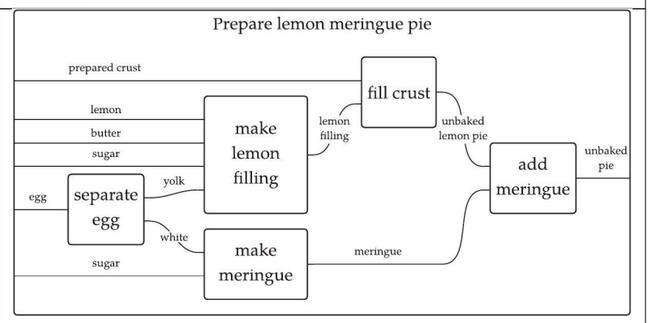
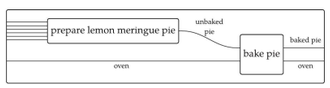
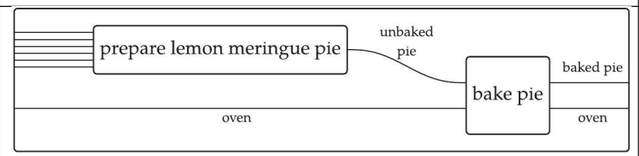
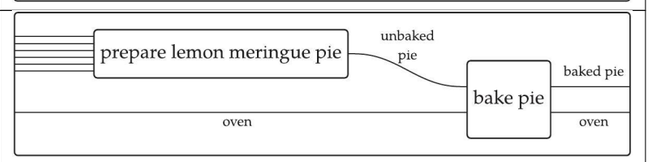
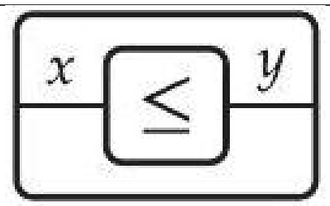
fong-spivak-invitation_DIM_2025	—	*(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-025_144_138_1349_870.jpg			
fong-spivak-invitation_DIM_2025	—	*(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-025_150_142_2095_516.jpg			
fong-spivak-invitation_DIM_2025	—	*(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-025_150_140_2095_752.jpg			
fong-spivak-invitation_DIM_2025	—	*(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-025_150_142_2095_986.jpg			

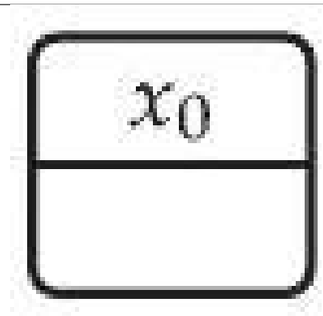
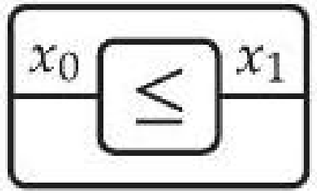
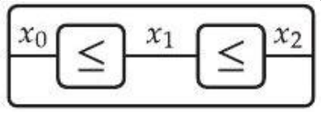
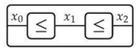
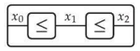
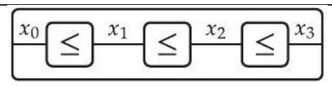
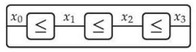
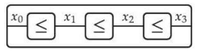
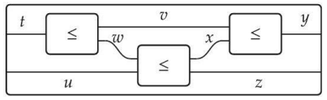
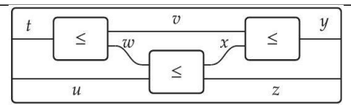
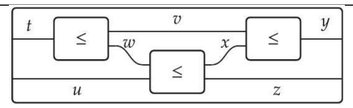
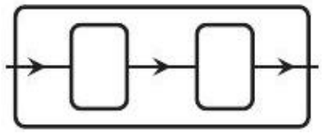
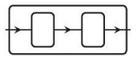
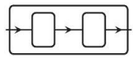
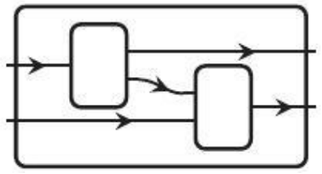
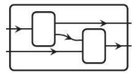
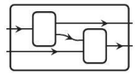
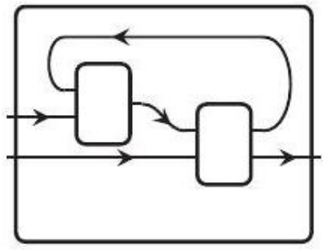
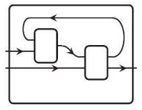
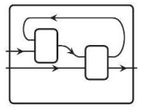
fong-spivak-invitation_DIV_2025	025	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-025_148_140_2097_1221.jpg			
fong-spivak-invitation_DIV_2026	026	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-026_182_174_2027_562.jpg			
fong-spivak-invitation_DIV_2026	026	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-026_182_172_2027_854.jpg			
fong-spivak-invitation_DIV_2026	026	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-026_184_172_2027_1146.jpg			
fong-spivak-invitation_DIV_2026	027	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-027_68_400_1517_738.jpg			

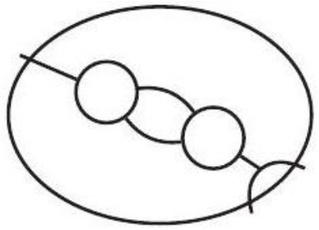
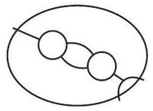
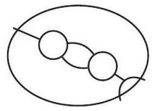
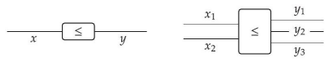
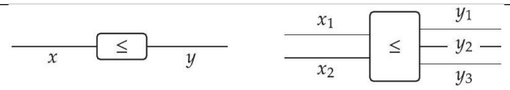
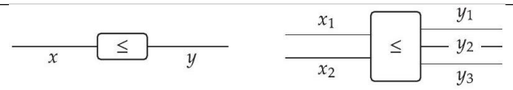
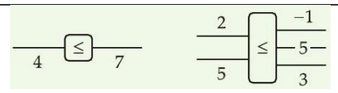
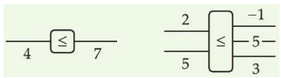
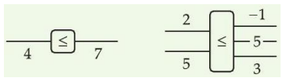
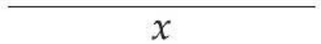
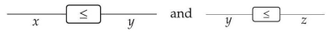
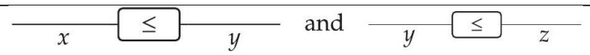
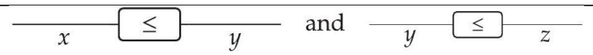
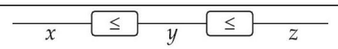
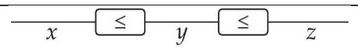
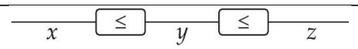
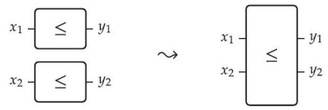
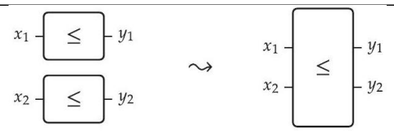
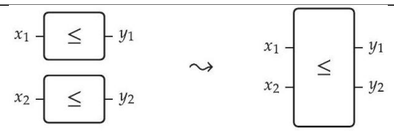
fong-spivak-invitation_DIN_027	027	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-027_142_124_2117_878.jpg			
fong-spivak-invitation_DIN_028	028	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-028_248_466_1557_706.jpg			
fong-spivak-invitation_DIN_029	030	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-030_56_630_300_626.jpg			
fong-spivak-invitation_DIN_030	030	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-030_264_428_1665_430.jpg			
fong-spivak-invitation_DIN_031	030	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-030_266_428_1665_1020.jpg			
fong-spivak-invitation_DIN_032	031	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-031_274_426_368_728.jpg			
fong-spivak-invitation_DIN_033	031	— *(dup)*	*no image for this region (500 in zip)*	*(no tex.zip crop for this row)*	*(image not on disk — pass –texzip or download the CDN crop)*	*(image not on disk — pass –texzip or download the CDN crop)*
fong-spivak-invitation_DIN_034	032	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-032_256_402_896_740.jpg			

fong-spivak-invitation_DIV_033	033	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-033_396_846_512_514.jpg			
fong-spivak-invitation_DIV_033	033	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-033_124_780_1148_548.jpg			
fong-spivak-invitation_DIV_033	033	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-033_566_1056_1651_412.jpg			
fong-spivak-invitation_DIV_036	036	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-036_344_330_1188_410.jpg			
fong-spivak-invitation_DIV_036	036	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-036_344_286_1188_818.jpg			

fong-spivak-invitation_DIM_0036	036	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-036_344_282_1188_1184.jpg			
fong-spivak-invitation_DIM_0039	039	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-039_256_242_302_818.jpg			
fong-spivak-invitation_DIM_0039	039	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-039_194_236_1657_820.jpg			
fong-spivak-invitation_DIM_0042	042	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-042_186_602_996_661.jpg			
fong-spivak-invitation_DIM_0042	042	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-042_190_604_1364_659.jpg			
fong-spivak-invitation_DIM_0043	043	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-043_174_228_824_580.jpg			

fong-spivak-invitation_DIV_043	043	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-043_180_252_818_1046.jpg			
fong-spivak-invitation_DIV_043	043	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-043_310_846_1853_514.jpg			
fong-spivak-invitation_DIV_044	044	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-044_266_1178_578_350.jpg			
fong-spivak-invitation_DIV_046	046	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-046_312_800_864_540.jpg			
fong-spivak-invitation_DIV_050	050	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-050_60_234_474_822.jpg			
fong-spivak-invitation_DIV_053	053	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-053_598_1207_270_336.jpg			
fong-spivak-invitation_DIV_053	053	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-053_280_1188_1104_344.jpg			
fong-spivak-invitation_DIV_056	056	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-056_84_134_1553_874.jpg			

fong-spivak-invitation_DIV_056	056	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-056_72_74_1801_368.jpg			
fong-spivak-invitation_DIV_056	056	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-056_72_118_1801_530.jpg			
fong-spivak-invitation_DIV_056	056	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-056_74_212_1801_736.jpg			
fong-spivak-invitation_DIV_056	056	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-056_74_304_1801_1036.jpg			
fong-spivak-invitation_DIV_056	056	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-056_158_538_2041_672.jpg			
fong-spivak-invitation_DIV_057	057	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-057_90_206_644_336.jpg			
fong-spivak-invitation_DIV_057	057	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-057_116_208_632_640.jpg			
fong-spivak-invitation_DIV_057	057	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-057_168_214_608_964.jpg			

fong-spivak-invitation_DIV_057	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-057_172_236_610_1309.jpg			
fong-spivak-invitation_DIV_058	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-058_134_796_268_544.jpg			
fong-spivak-invitation_DIV_058	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-058_116_442_1080_722.jpg			
fong-spivak-invitation_DIV_058	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-058_36_246_1527_816.jpg			
fong-spivak-invitation_DIV_058	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-058_76_922_1743_478.jpg			
fong-spivak-invitation_DIV_058	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-058_66_548_1955_668.jpg			
fong-spivak-invitation_DIV_059	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-059_200_606_268_634.jpg			
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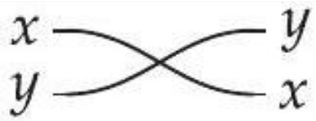
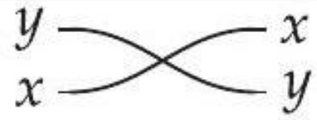
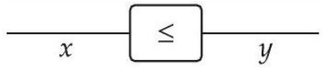
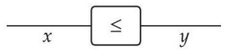
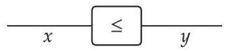
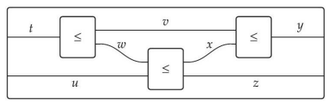
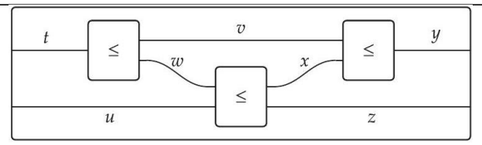
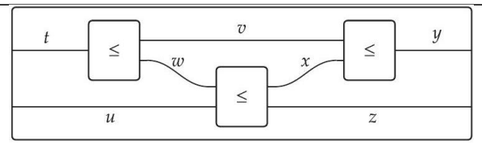
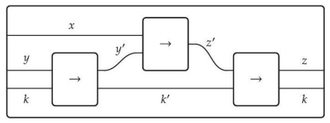
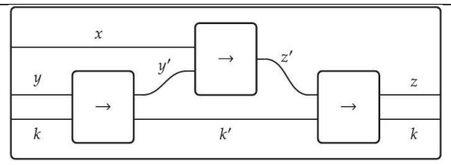
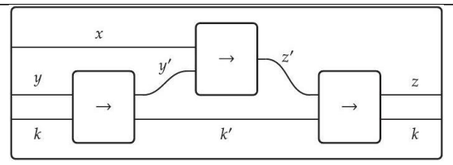
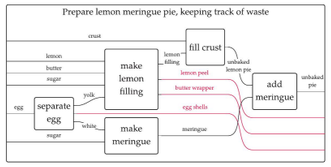
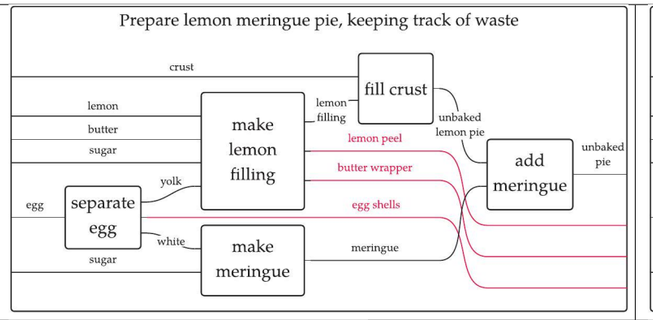
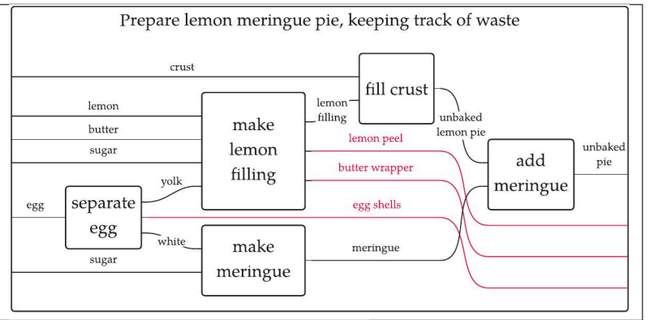
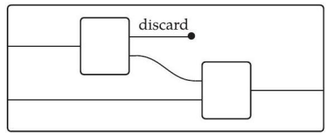
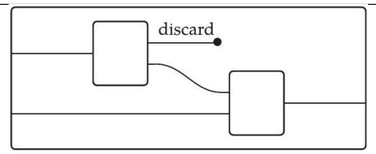
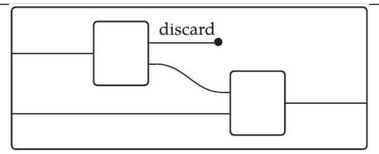
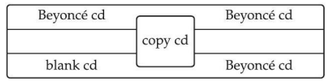
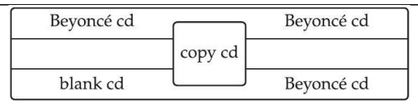
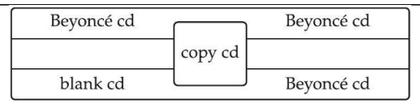
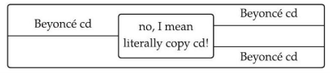
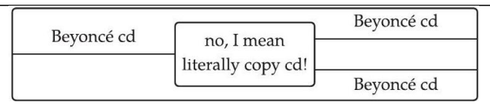
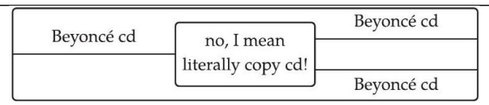
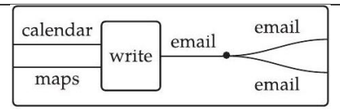
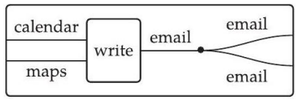
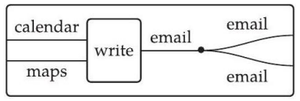
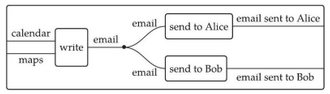
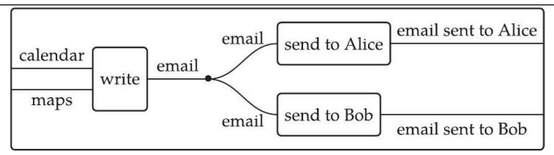
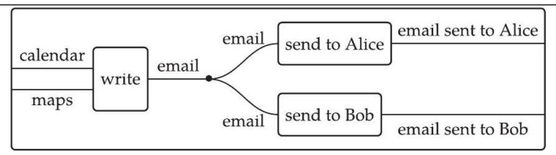
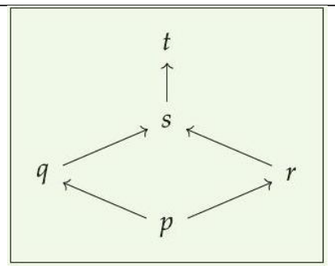
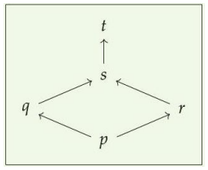
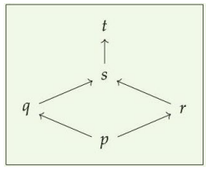
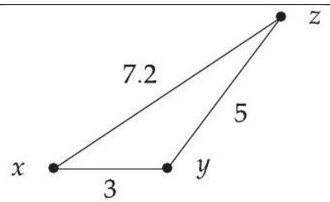
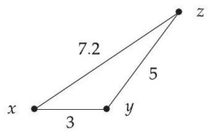
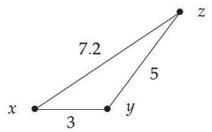
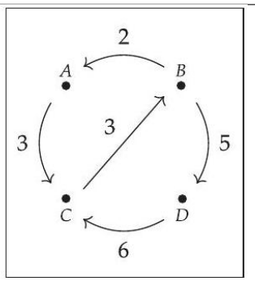
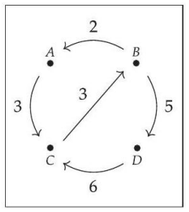
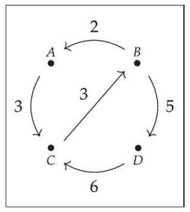
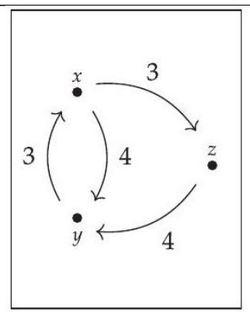
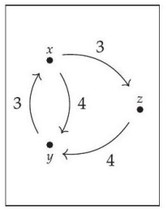
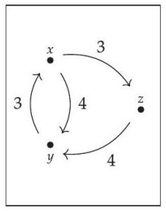
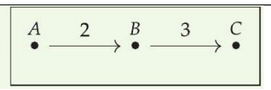
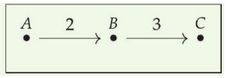
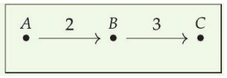
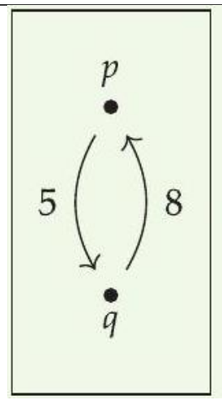
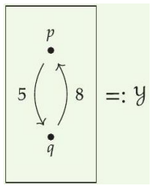
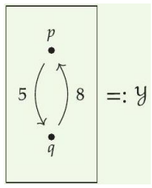
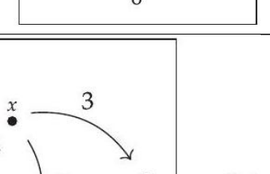
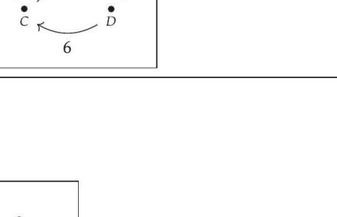
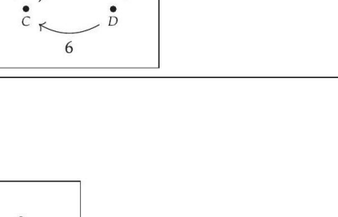
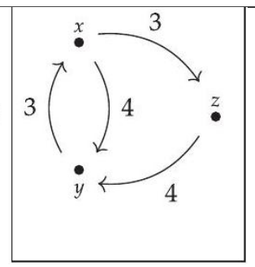
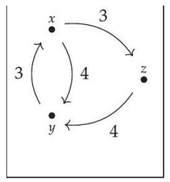
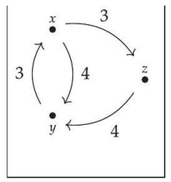
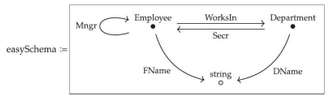
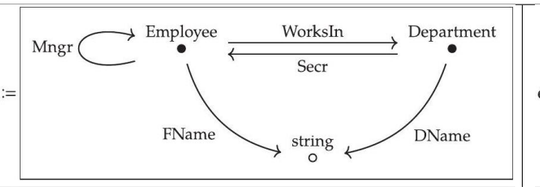
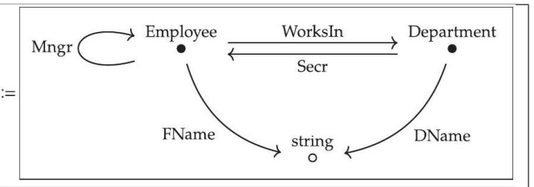
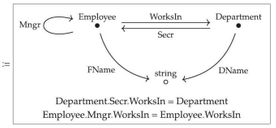
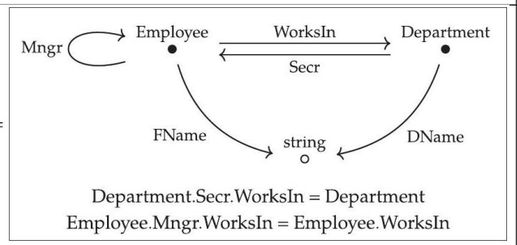
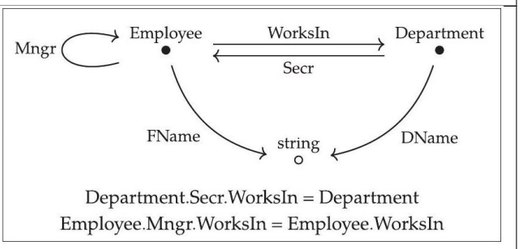
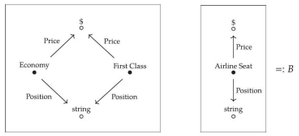
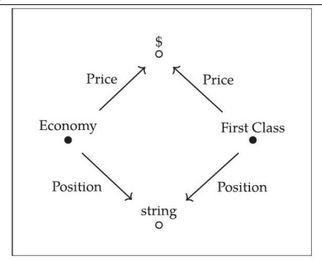
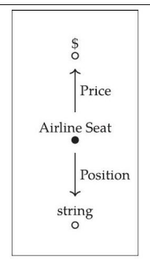
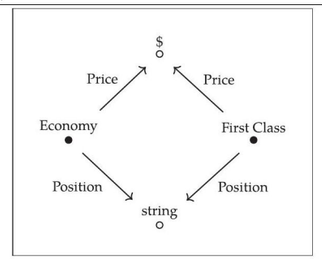
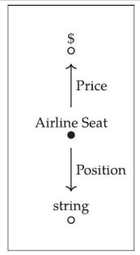
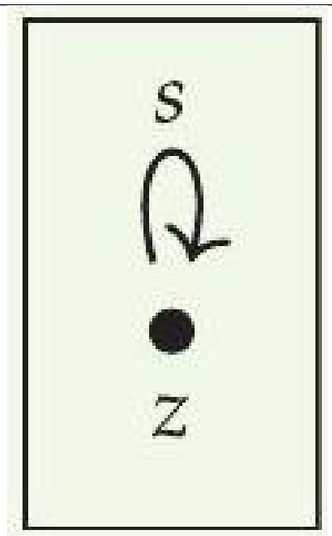
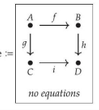
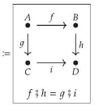
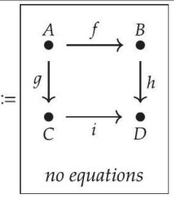
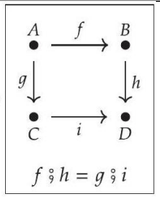
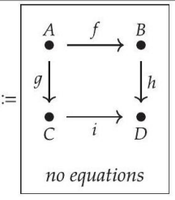
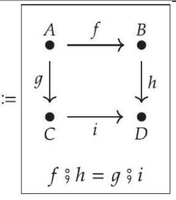
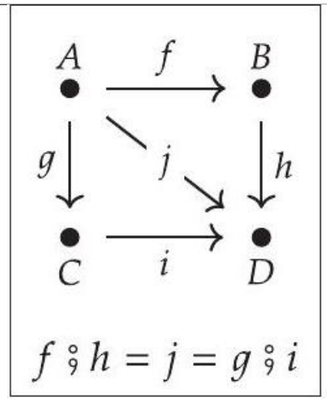
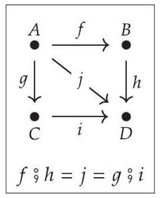
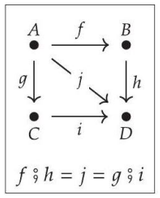
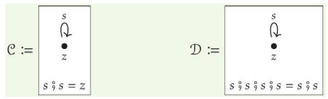
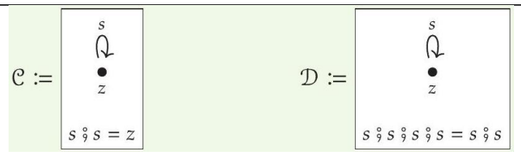
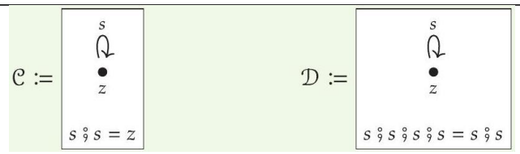
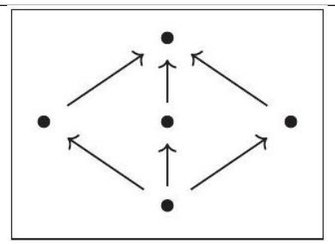
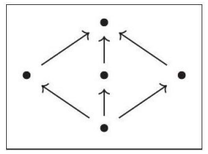
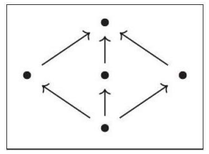
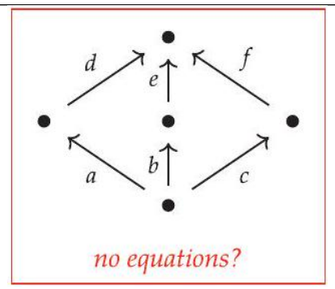
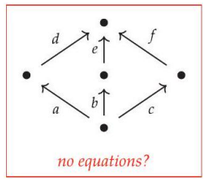
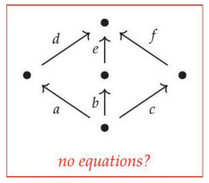
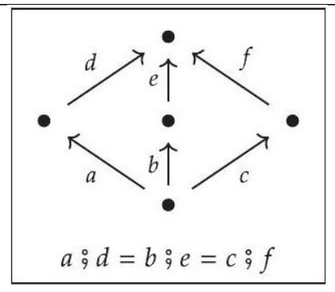
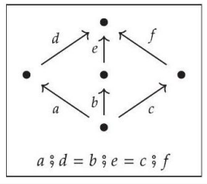
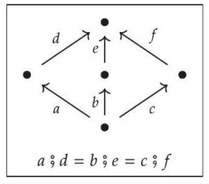
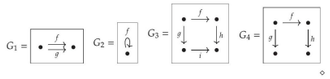
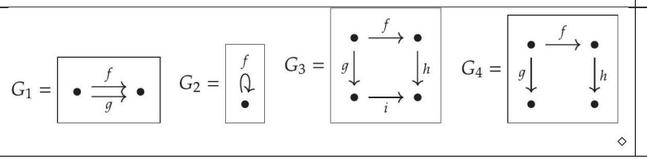
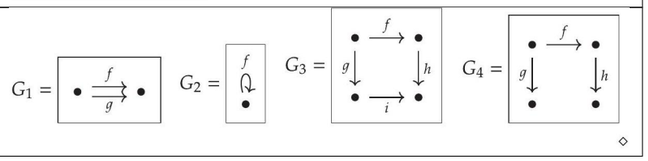
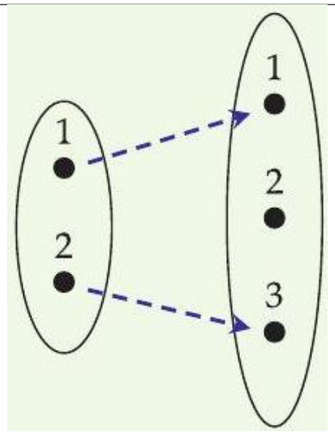
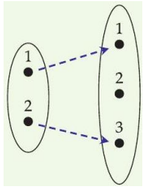
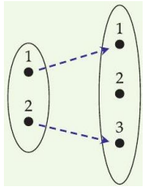
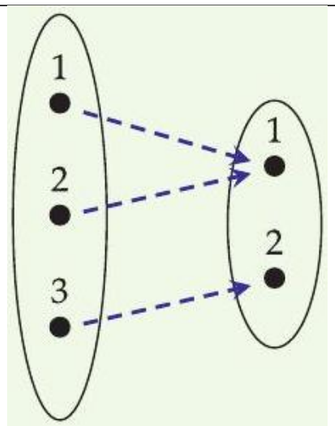
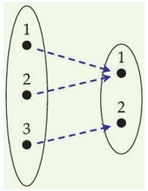
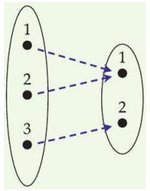
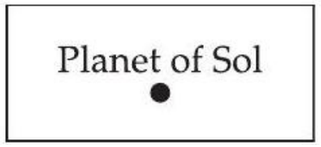
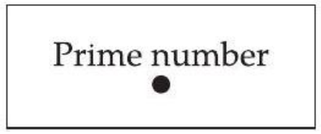
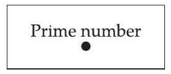
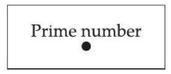
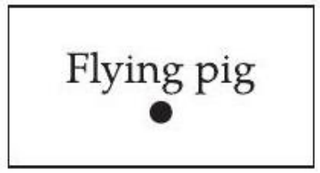
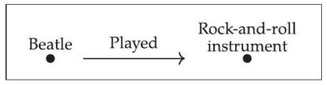
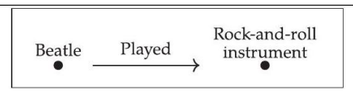
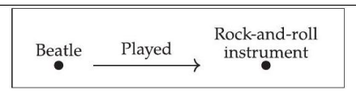
fong-spivak-invitation_DIV_059	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-059_64_164_1527_688.jpg			
fong-spivak-invitation_DIV_059	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-059_64_166_1527_1024.jpg			
fong-spivak-invitation_DIV_059	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-059_74_352_2005_762.jpg			
fong-spivak-invitation_DIV_060	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-060_220_744_260_568.jpg			
fong-spivak-invitation_DIV_062	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-062_250_696_1277_592.jpg			

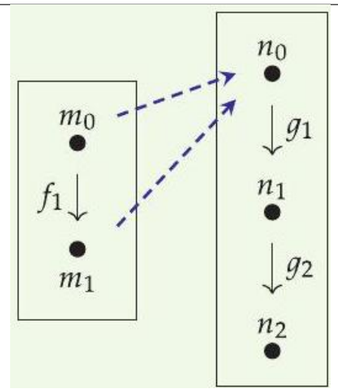
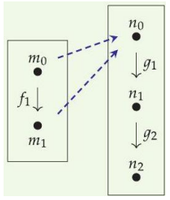
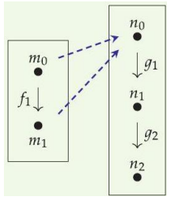
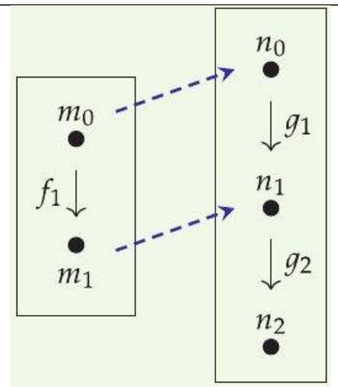
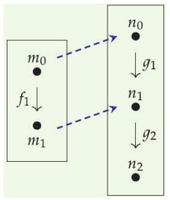
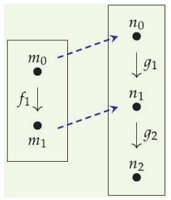
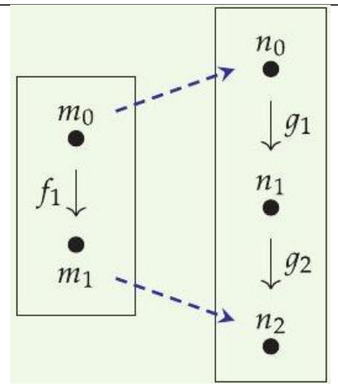
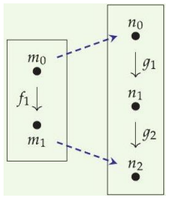
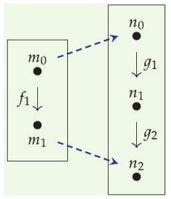
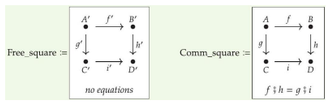
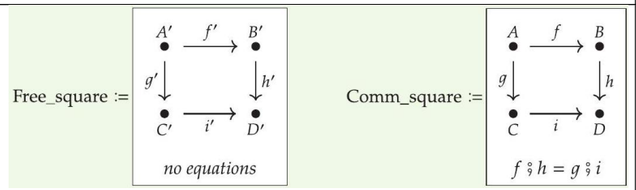
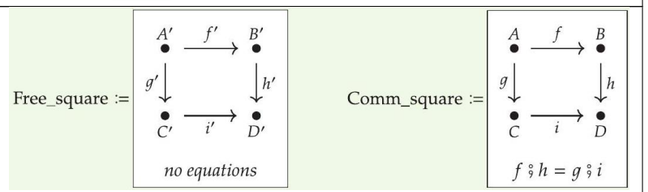
fong-spivak-invitation_DIN_063	— (dup)	05b3e583-fc72-4ff5-9914-6f882b9df5b5-063_588_1186_272_344.jpg			
fong-spivak-invitation_DIN_063	— (dup)	05b3e583-fc72-4ff5-9914-6f882b9df5b5-063_234_576_1100_650.jpg			
fong-spivak-invitation_DIN_064	— (dup)	05b3e583-fc72-4ff5-9914-6f882b9df5b5-064_154_644_648_618.jpg			
fong-spivak-invitation_DIN_064	— (dup)	05b3e583-fc72-4ff5-9914-6f882b9df5b5-064_152_754_900_562.jpg			
fong-spivak-invitation_DIN_064	— (dup)	05b3e583-fc72-4ff5-9914-6f882b9df5b5-064_152_468_1477_706.jpg			
fong-spivak-invitation_DIN_064	— (dup)	05b3e583-fc72-4ff5-9914-6f882b9df5b5-064_234_862_1731_510.jpg			
fong-spivak-invitation_DIN_070	— (dup)	05b3e583-fc72-4ff5-9914-6f882b9df5b5-070_262_322_1673_798.jpg			
fong-spivak-invitation_DIN_073	— (dup)	05b3e583-fc72-4ff5-9914-6f882b9df5b5-073_203_327_382_775.jpg			

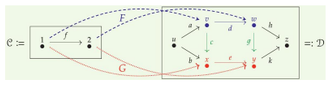
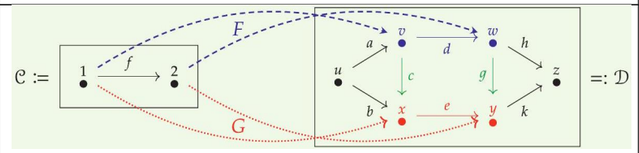
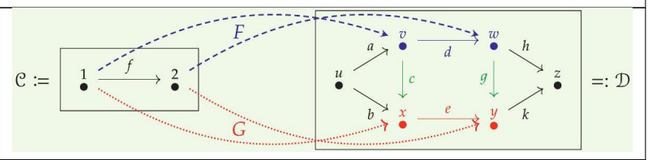
fong-spivak-invitation_DIV_0075	075	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-075_330_384_602_398.jpg	$X :=$ 	$X :=$ 	$X :=$ 
fong-spivak-invitation_DIV_0075	075	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-075_330_344_604_1052.jpg	 $=: Y$	 $=: Y$	 $=: Y$
fong-spivak-invitation_DIV_0080	080	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-080_116_444_2017_540.jpg	$\mathcal{X} :=$ 	$\mathcal{X} :=$ 	$\mathcal{X} :=$ 
fong-spivak-invitation_DIV_0080	080	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-080_288_234_1939_1108.jpg	 $=: \mathcal{Y}$	 $=: \mathcal{Y}$	 $=: \mathcal{Y}$
fong-spivak-invitation_DIV_0081	081	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-081_328_652_536_610.jpg	$\mathcal{X} \times \mathcal{Y} =$ 	$\mathcal{X} \times \mathcal{Y} =$ 	$\mathcal{X} \times \mathcal{Y} =$ 
fong-spivak-invitation_DIV_0088	088	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-088_278_346_670_370.jpg	$Y :=$ 	$Y :=$ 	$Y :=$ 

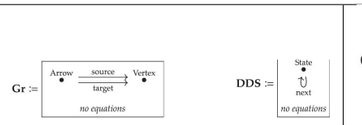
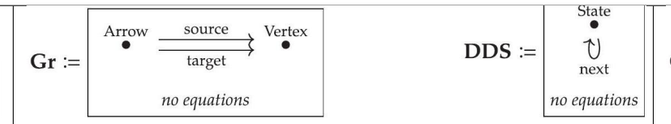
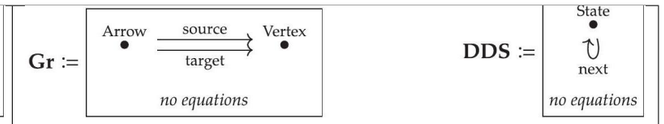
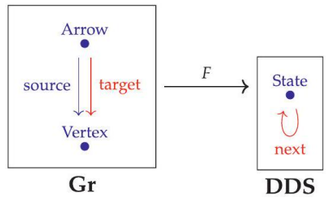
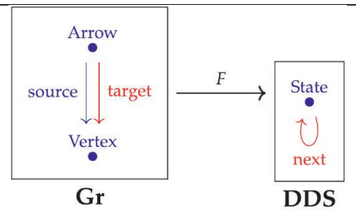
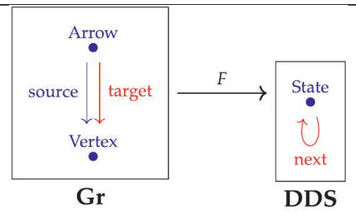
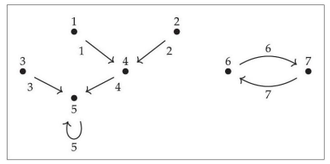
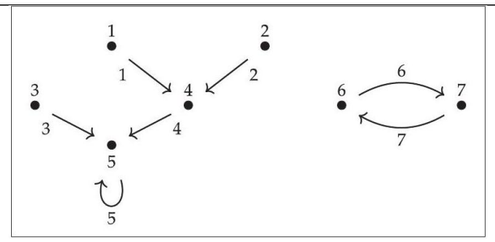
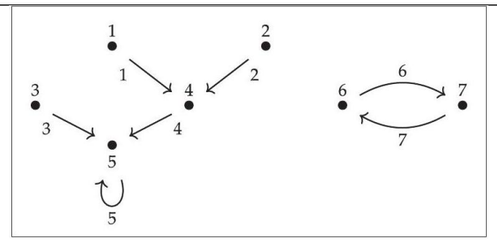
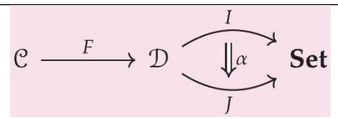
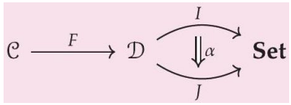
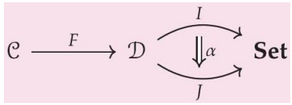
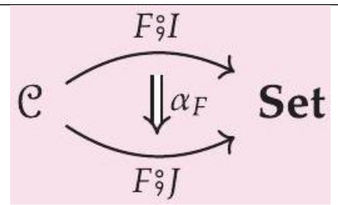
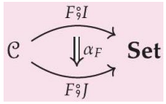
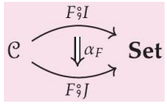
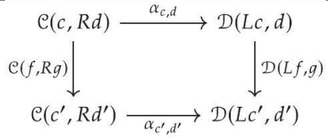
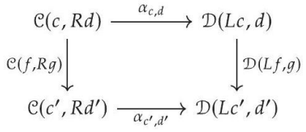
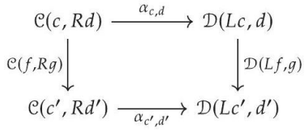
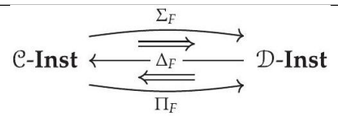
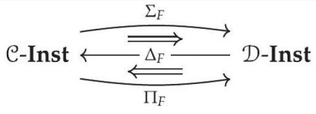
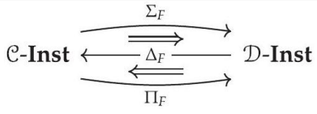
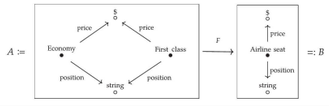
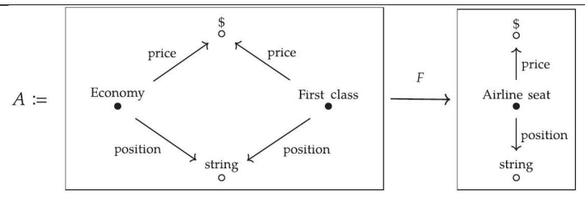
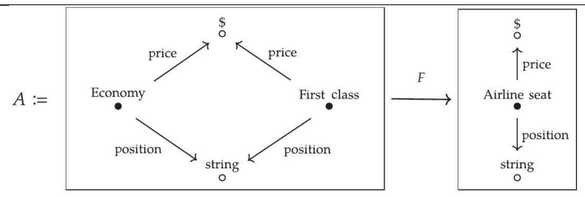
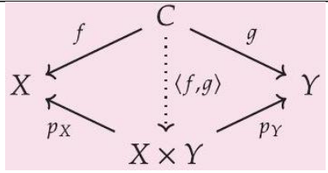
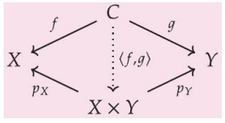
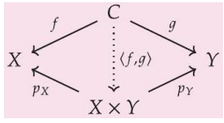
fong-spivak-invitation_DIV_092	092	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-092_294_1042_814_386.jpg		easySchema := 	easySchema := 
fong-spivak-invitation_DIV_093	093	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-093_396_1032_258_388.jpg		mySchema := 	mySchema := 
fong-spivak-invitation_DIV_094	094	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-094_488_1194_620_342.jpg		$A :=$   $=: B$	$A :=$   $=: B$
fong-spivak-invitation_DIV_095	097	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-097_176_106_962_884.jpg			
fong-spivak-invitation_DIV_096	098	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-098_312_984_550_446.jpg	Free_square :=  Comm_square := 	Free_square :=  *no equations* Comm_square :=  $f \mathbin{⨾} h = g \mathbin{⨾} i$	Free_square :=  *no equations* Comm_square :=  $f \mathbin{⨾} h = g \mathbin{⨾} i$

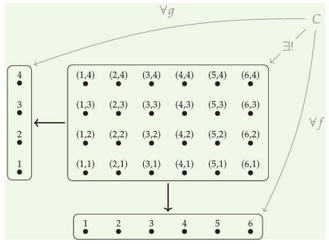
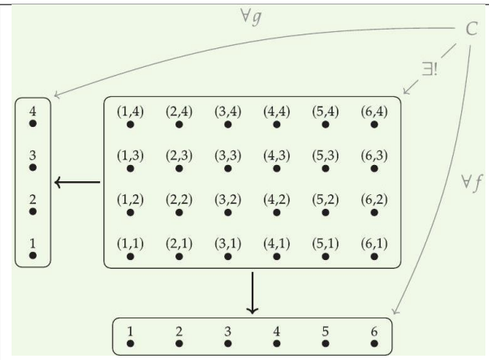
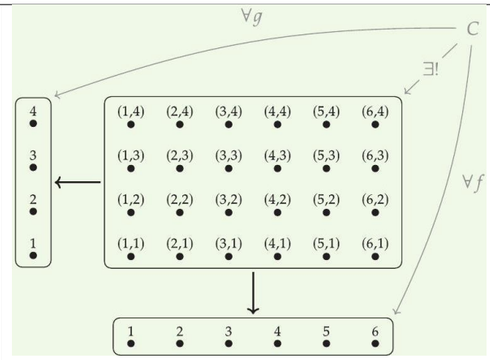
fong-spivak-invitation_DI_098	098	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-098_306_246_1937_820.jpg			
fong-spivak-invitation_DI_099	099	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-099_234_810_452_534.jpg			
fong-spivak-invitation_DI_100	100	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-100_238_322_314_364.jpg			
fong-spivak-invitation_DI_100	100	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-100_282_320_270_780.jpg			
fong-spivak-invitation_DI_100	100	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-100_282_320_270_1196.jpg			
fong-spivak-invitation_DI_100	100	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-100_272_1202_1018_346.jpg			

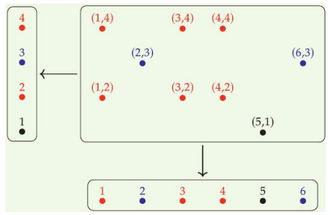
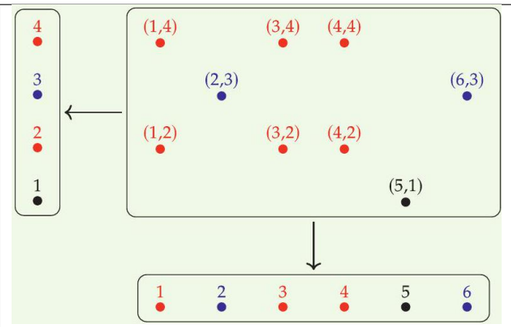
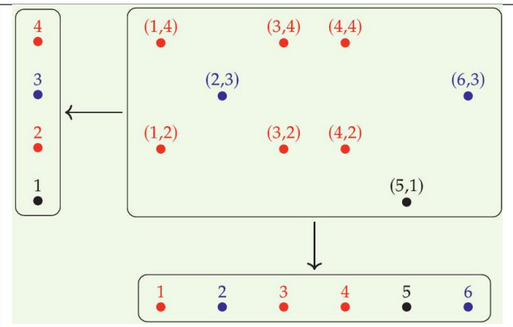
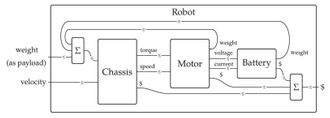
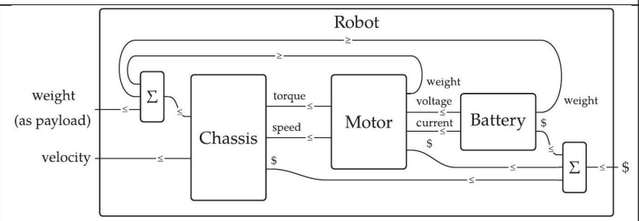
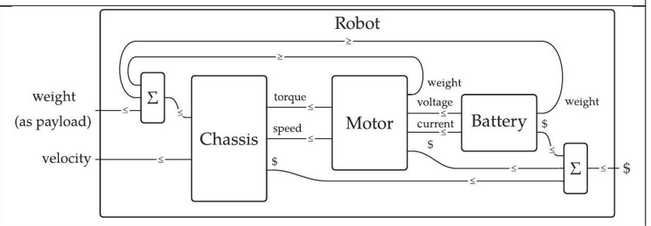
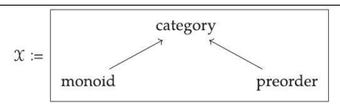
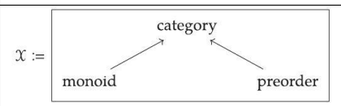
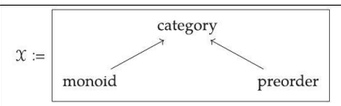
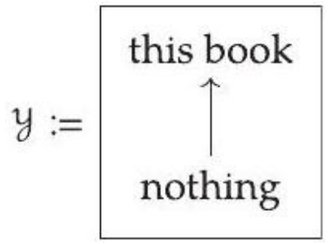
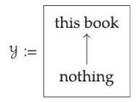
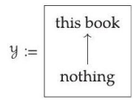
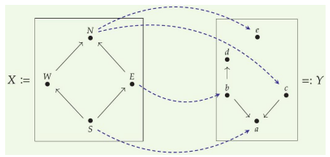
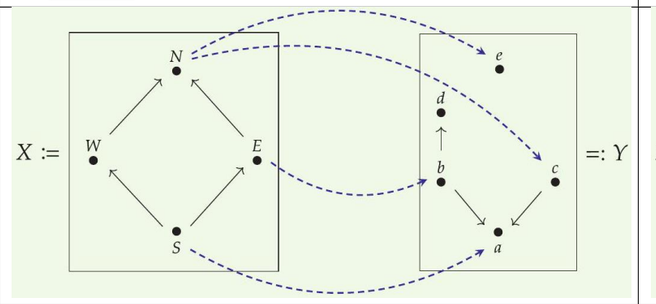
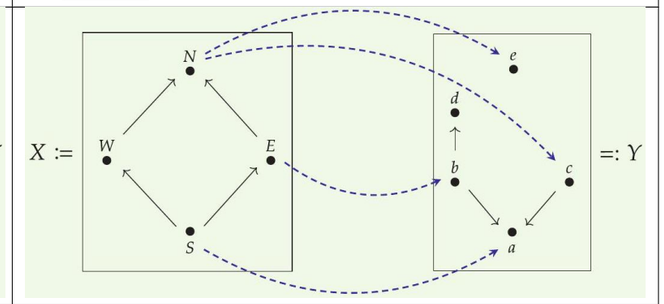
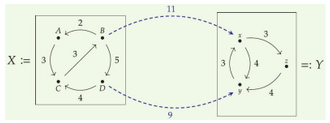
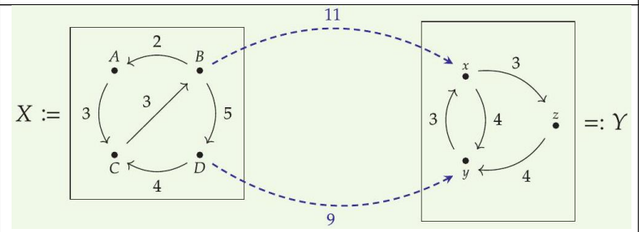
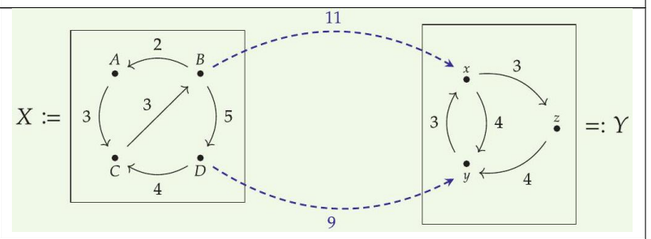
fong-spivak-invitation_DI_0103	103	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-103_296_222_1481_578.jpg			
fong-spivak-invitation_DI_0103	103	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-103_298_226_1481_1070.jpg			
fong-spivak-invitation_DI_0104	104	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-104_110_238_1509_342.jpg			
fong-spivak-invitation_DI_0104	104	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-104_110_262_1509_824.jpg			
fong-spivak-invitation_DI_0104	104	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-104_114_210_1505_1331.jpg			
fong-spivak-invitation_DI_0105	105	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-105_134_540_626_668.jpg			

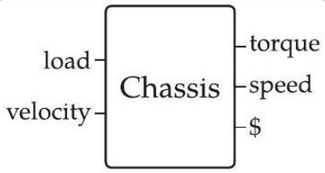
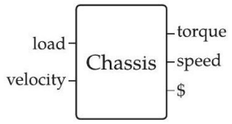
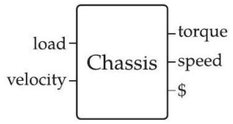
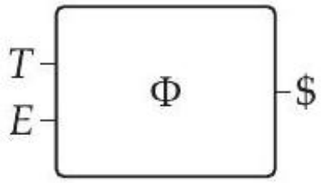
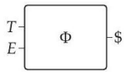
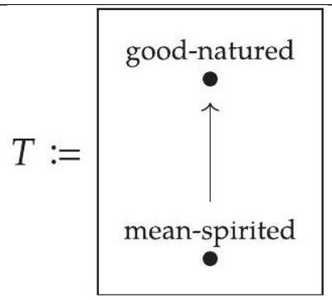
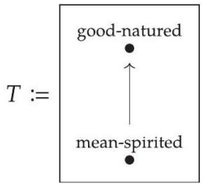
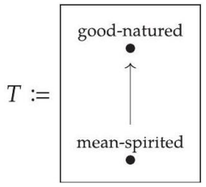
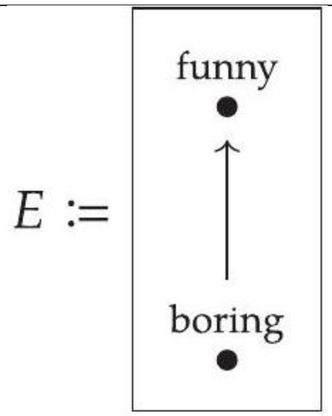
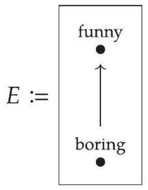
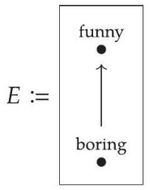
fong-spivak-invitation_DI_105	105	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-105_312_260_1917_364.jpg			
fong-spivak-invitation_DI_105	105	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-105_310_260_1921_808.jpg			
fong-spivak-invitation_DI_105	105	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-105_308_260_1921_1251.jpg			
fong-spivak-invitation_DI_106	106	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-106_312_1056_954_410.jpg			

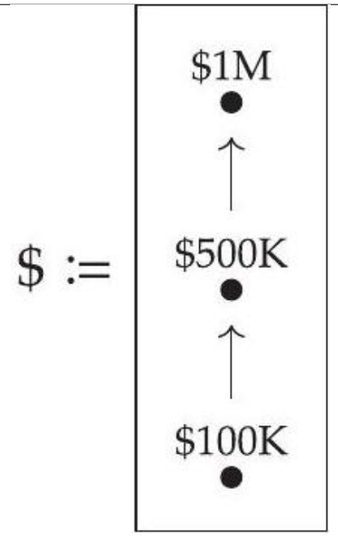
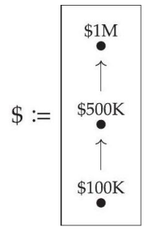
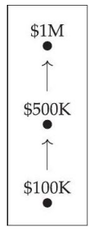
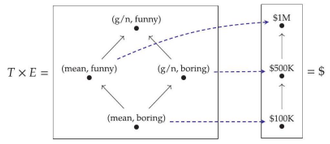
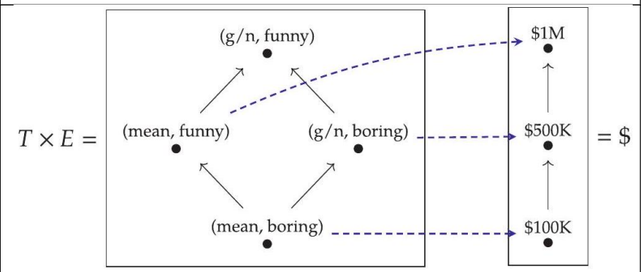
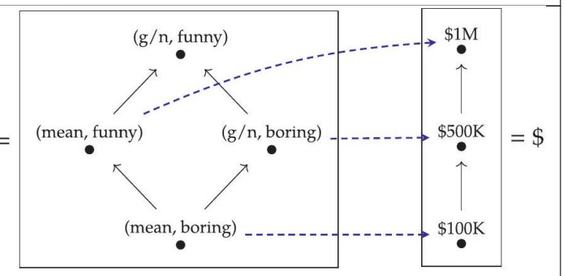
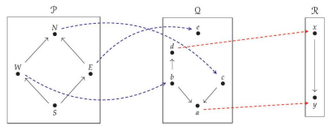
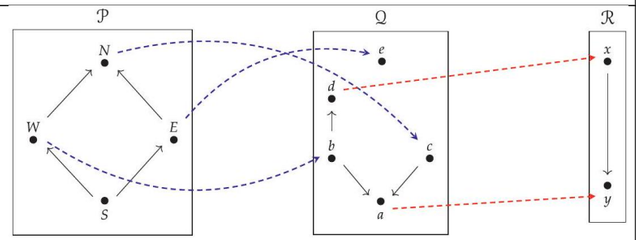
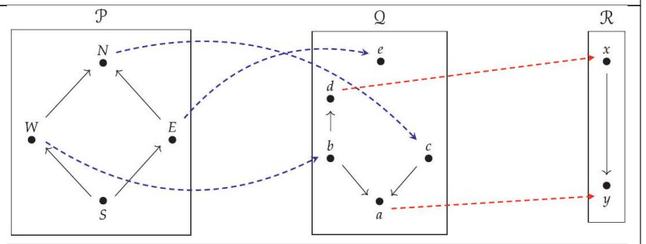
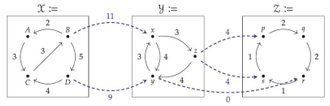
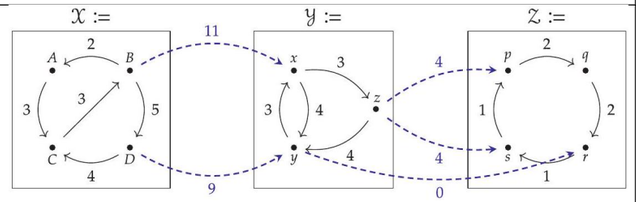
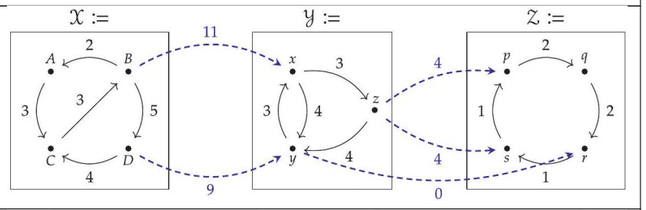
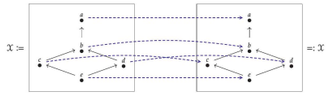
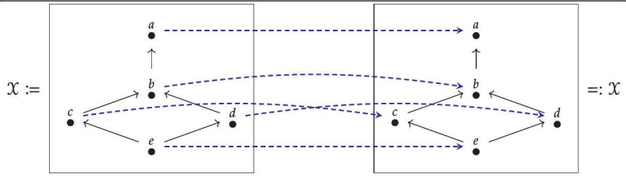
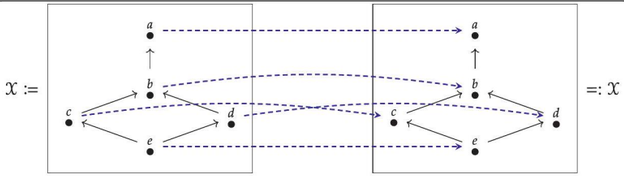
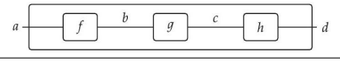
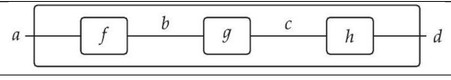
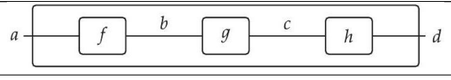
fong-spivak-invitation_DI_109	109	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-109_222_132_1048_638.jpg	$\begin{tikzcd} s \arrow[loop above] \\ z \end{tikzcd}$ $s \mathbin{⨾} s = z$	$\begin{tikzcd} s \arrow[loop above] \\ z \end{tikzcd}$ $s \mathbin{⨾} s = z$	$\begin{tikzcd} s \arrow[loop above] \\ z \end{tikzcd}$ $s \mathbin{⨾} s = z$
fong-spivak-invitation_DI_109	109	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-109_174_342_1098_934.jpg	$\begin{tikzcd} a \arrow[r, "f"] & b \arrow[r, shift left, "g"] \arrow[r, shift right, "h"'] & c \end{tikzcd}$ $f \mathbin{⨾} g = f \mathbin{⨾} h$	$\begin{tikzcd} a \arrow[r, "f"] & b \arrow[r, shift left, "g"] \arrow[r, shift right, "h"'] & c \end{tikzcd}$ $f \mathbin{⨾} g = f \mathbin{⨾} h$	$\begin{tikzcd} a \arrow[r, "f"] & b \arrow[r, shift left, "g"] \arrow[r, shift right, "h"'] & c \end{tikzcd}$ $f \mathbin{⨾} g = f \mathbin{⨾} h$
fong-spivak-invitation_DI_109	109	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-109_148_230_1937_822.jpg	$\begin{tikzcd} \mathcal{C} \arrow[r, bend left, "F"] \arrow[r, bend right, "G"'] \arrow[r, phantom, "\Downarrow\alpha"] & \mathcal{D} \end{tikzcd}$	$\begin{tikzcd} \mathcal{C} \arrow[r, bend left, "F"] \arrow[r, bend right, "G"'] \arrow[r, phantom, "\Downarrow\alpha"] & \mathcal{D} \end{tikzcd}$	$\begin{tikzcd} \mathcal{C} \arrow[r, bend left, "F"] \arrow[r, bend right, "G"'] \arrow[r, phantom, "\Downarrow\alpha"] & \mathcal{D} \end{tikzcd}$
fong-spivak-invitation_DI_110	110	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-110_200_342_1068_770.jpg	$\begin{tikzcd} F(c) \arrow[r, "\alpha_c"] \arrow[d, "F(f)"'] & G(c) \arrow[d, "G(f)"] \\ F(d) \arrow[r, "\alpha_d"'] & G(d) \end{tikzcd}$	$\begin{tikzcd} F(c) \arrow[r, "\alpha_c"] \arrow[d, "F(f)"'] & G(c) \arrow[d, "G(f)"] \\ F(d) \arrow[r, "\alpha_d"'] & G(d) \end{tikzcd}$	$\begin{tikzcd} F(c) \arrow[r, "\alpha_c"] \arrow[d, "F(f)"'] & G(c) \arrow[d, "G(f)"] \\ F(d) \arrow[r, "\alpha_d"'] & G(d) \end{tikzcd}$
fong-spivak-invitation_DI_110	110	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-110_276_1192_1801_344.jpg			
fong-spivak-invitation_DI_114	114	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-114_150_450_388_400.jpg	$\begin{tikzcd} G(\mathrm{Arrow}) \arrow[r, "\alpha_{\mathrm{Arrow}}"] \arrow[d, "G(\mathrm{source})"'] & H(\mathrm{Arrow}) \arrow[d, "H(\mathrm{source})"] \\ G(\mathrm{Vertex}) \arrow[r, "\alpha_{\mathrm{Vertex}}"'] & H(\mathrm{Vertex}) \end{tikzcd}$	$\begin{tikzcd} G(\mathrm{Arrow}) \arrow[r, "\alpha_{\mathrm{Arrow}}"] \arrow[d, "G(\mathrm{source})"'] & H(\mathrm{Arrow}) \arrow[d, "H(\mathrm{source})"] \\ G(\mathrm{Vertex}) \arrow[r, "\alpha_{\mathrm{Vertex}}"'] & H(\mathrm{Vertex}) \end{tikzcd}$	$\begin{tikzcd} G(\mathrm{Arrow}) \arrow[r, "\alpha_{\mathrm{Arrow}}"] \arrow[d, "G(\mathrm{source})"'] & H(\mathrm{Arrow}) \arrow[d, "H(\mathrm{source})"] \\ G(\mathrm{Vertex}) \arrow[r, "\alpha_{\mathrm{Vertex}}"'] & H(\mathrm{Vertex}) \end{tikzcd}$
fong-spivak-invitation_DI_114	114	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-114_150_434_388_1042.jpg	$\begin{tikzcd} G(\mathrm{Arrow}) \arrow[r, "\alpha_{\mathrm{Arrow}}"] \arrow[d, "G(\mathrm{target})"'] & H(\mathrm{Arrow}) \arrow[d, "H(\mathrm{target})"] \\ G(\mathrm{Vertex}) \arrow[r, "\alpha_{\mathrm{Vertex}}"'] & H(\mathrm{Vertex}) \end{tikzcd}$	$\begin{tikzcd} G(\mathrm{Arrow}) \arrow[r, "\alpha_{\mathrm{Arrow}}"] \arrow[d, "G(\mathrm{target})"'] & H(\mathrm{Arrow}) \arrow[d, "H(\mathrm{target})"] \\ G(\mathrm{Vertex}) \arrow[r, "\alpha_{\mathrm{Vertex}}"'] & H(\mathrm{Vertex}) \end{tikzcd}$	$\begin{tikzcd} G(\mathrm{Arrow}) \arrow[r, "\alpha_{\mathrm{Arrow}}"] \arrow[d, "G(\mathrm{target})"'] & H(\mathrm{Arrow}) \arrow[d, "H(\mathrm{target})"] \\ G(\mathrm{Vertex}) \arrow[r, "\alpha_{\mathrm{Vertex}}"'] & H(\mathrm{Vertex}) \end{tikzcd}$

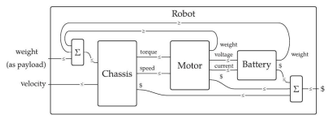
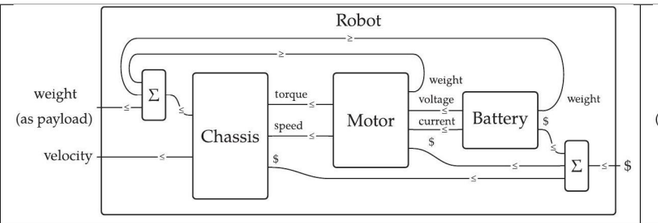
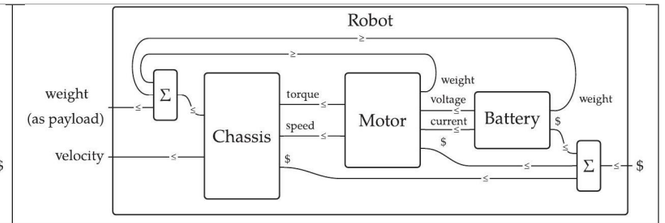
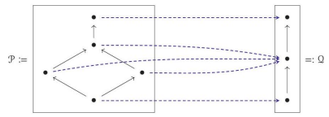
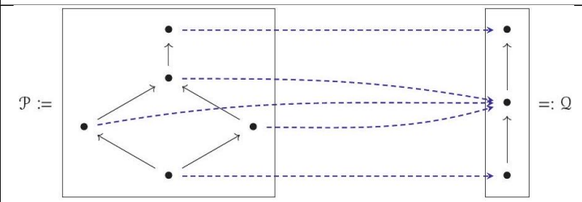
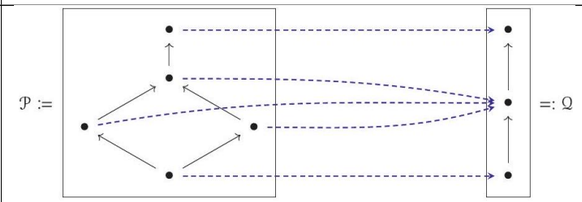
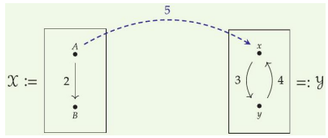
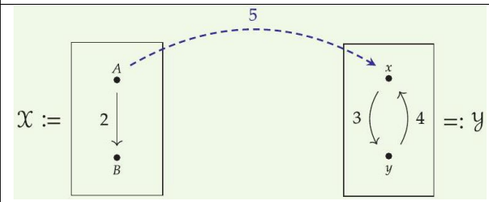
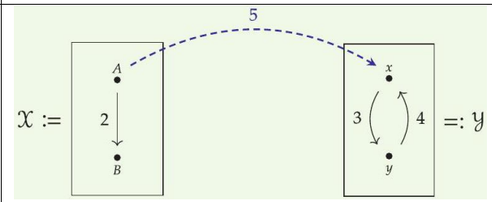
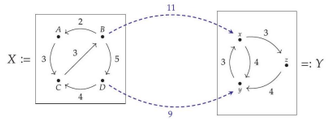
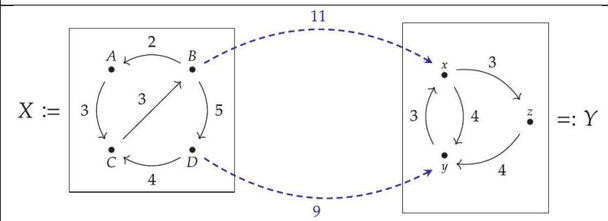
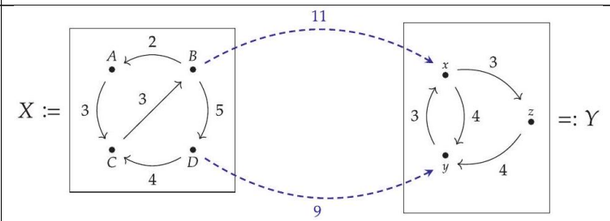
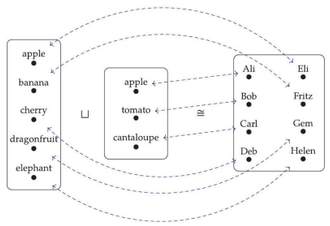
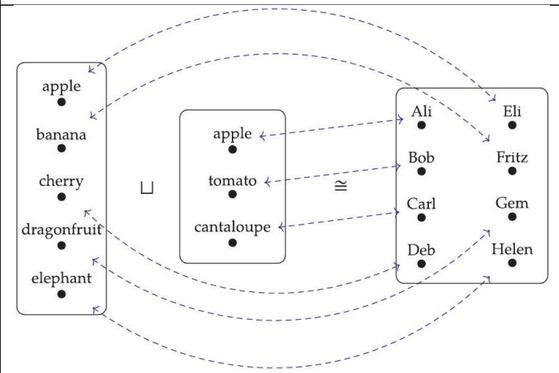
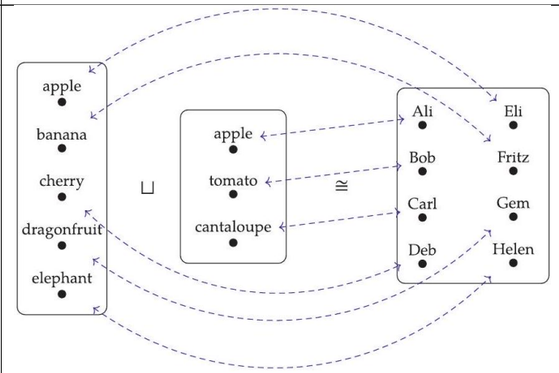
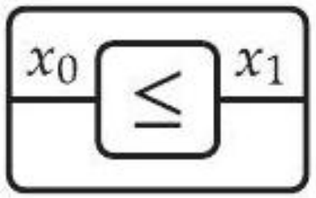
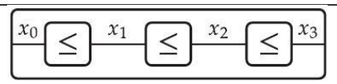
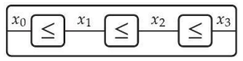
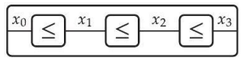
fong-spivak-invitation_DI_115	115	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-115_204_1112_944_380.jpg			
fong-spivak-invitation_DI_116	116	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-116_328_542_272_670.jpg			
fong-spivak-invitation_DI_116	116	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-116_374_768_1869_556.jpg			
fong-spivak-invitation_DI_117	117	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-117_160_458_1038_452.jpg			
fong-spivak-invitation_DI_117	117	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-117_160_256_1038_1168.jpg			
fong-spivak-invitation_DI_118	118	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-118_206_480_2059_712.jpg			
fong-spivak-invitation_DI_119	119	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-119_172_498_2115_690.jpg			
fong-spivak-invitation_DI_120	120	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-120_368_1215_1217_334.jpg			
fong-spivak-invitation_DI_124	124	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-124_184_350_712_766.jpg			

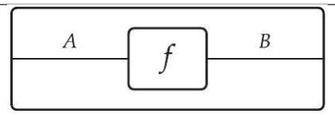
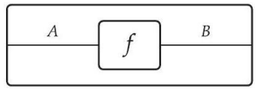
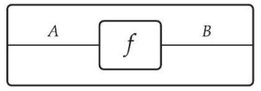
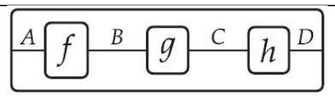
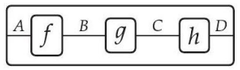
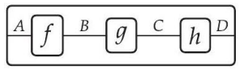
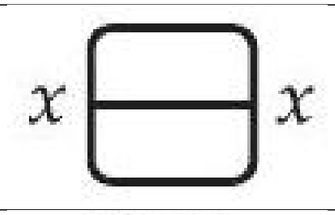
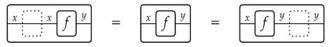
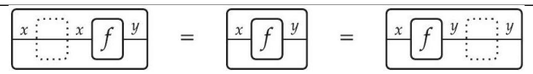
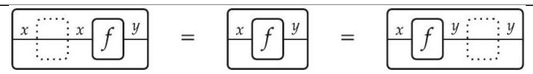
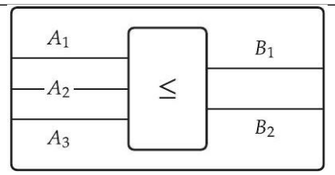
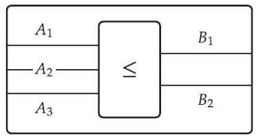
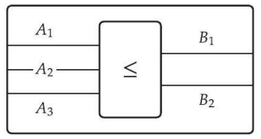
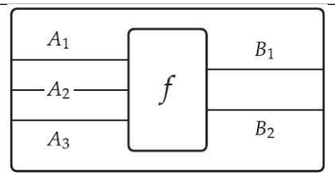
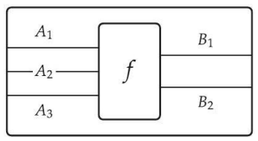
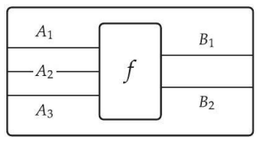
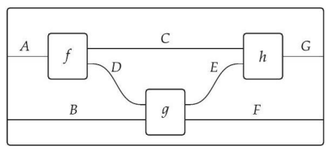
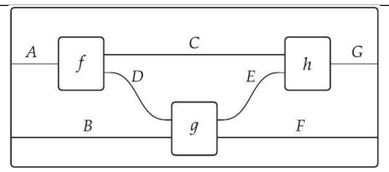
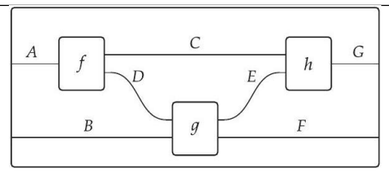
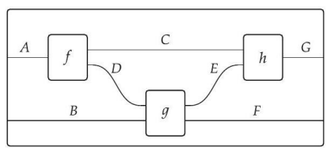
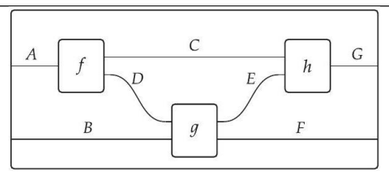
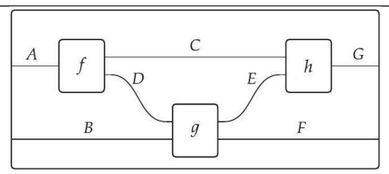
fong-spivak-invitation_DI_124	124	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-124_562_760_1665_560.jpg			
fong-spivak-invitation_DI_125	125	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-125_220_354_1893_762.jpg	$$\begin{tikzcd} & C \arrow[dl, "f"'] \arrow[dr, "g"] \arrow[dd, "a"] & \\ X & & Y \\ & C' \arrow[ul, "f'"] \arrow[ur, "g'"'] & \end{tikzcd}$$	$$\begin{tikzcd} & C \arrow[dl, "f"'] \arrow[dr, "g"] \arrow[dd, "a"] & \\ X & & Y \\ & C' \arrow[ul, "f'"] \arrow[ur, "g'"'] & \end{tikzcd}$$	$$\begin{tikzcd} & C \arrow[dl, "f"'] \arrow[dr, "g"] \arrow[dd, "a"] & \\ X & & Y \\ & C' \arrow[ul, "f'"] \arrow[ur, "g'"'] & \end{tikzcd}$$
fong-spivak-invitation_DI_126	126	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-126_118_318_1357_782.jpg	$$\begin{tikzcd} 1 \arrow[dr] & & 3 \arrow[dl] \arrow[dr, bend left] \arrow[dr, bend right] & & \\ & 2 & & 4 \arrow[r] & 5 \end{tikzcd}$$	$$\begin{tikzcd} 1 \arrow[dr] & & 3 \arrow[dl] \arrow[dr, bend left] \arrow[dr, bend right] & & \\ & 2 & & 4 \arrow[r] & 5 \end{tikzcd}$$	$$\begin{tikzcd} 1 \arrow[dr] & & 3 \arrow[dl] \arrow[dr, bend left] \arrow[dr, bend right] & & \\ & 2 & & 4 \arrow[r] & 5 \end{tikzcd}$$
fong-spivak-invitation_DI_126	126	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-126_268_524_1625_370.jpg	$$\begin{tikzcd} D_1 \arrow[dr] & & D_3 \arrow[dl] \arrow[dr, bend left] \arrow[dr, bend right] & & \\ & D_2 & & D_4 \arrow[r] & D_5 \end{tikzcd}$$	$$\begin{tikzcd} D_1 \arrow[dr] & & D_3 \arrow[dl] \arrow[dr, bend left] \arrow[dr, bend right] & & \\ & D_2 & & D_4 \arrow[r] & D_5 \end{tikzcd}$$	$$\begin{tikzcd} D_1 \arrow[dr] & & D_3 \arrow[dl] \arrow[dr, bend left] \arrow[dr, bend right] & & \\ & D_2 & & D_4 \arrow[r] & D_5 \end{tikzcd}$$
fong-spivak-invitation_DI_126	126	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-126_266_522_1627_988.jpg	$$\begin{tikzcd} & C \arrow[dl, bend right, "c_1"'] \arrow[dl, bend left, "c_2"] \arrow[d, "c_3"] \arrow[dr, bend left, "c_4"] \arrow[dr, bend right, "c_5"'] & \\ D_1 \arrow[dr] & D_3 \arrow[dl] \arrow[dr, bend left] \arrow[dr, bend right] & \\ & D_2 & D_4 \arrow[r] & D_5 \end{tikzcd}$$	$$\begin{tikzcd} & C \arrow[dl, bend right, "c_1"'] \arrow[dl, bend left, "c_2"] \arrow[d, "c_3"] \arrow[dr, bend left, "c_4"] \arrow[dr, bend right, "c_5"'] & \\ D_1 \arrow[dr] & D_3 \arrow[dl] \arrow[dr, bend left] \arrow[dr, bend right] & \\ & D_2 & D_4 \arrow[r] & D_5 \end{tikzcd}$$	$$\begin{tikzcd} & C \arrow[dl, bend right, "c_1"'] \arrow[dl, bend left, "c_2"] \arrow[d, "c_3"] \arrow[dr, bend left, "c_4"] \arrow[dr, bend right, "c_5"'] & \\ D_1 \arrow[dr] & D_3 \arrow[dl] \arrow[dr, bend left] \arrow[dr, bend right] & \\ & D_2 & D_4 \arrow[r] & D_5 \end{tikzcd}$$
fong-spivak-invitation_DI_128	128	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-128_206_226_654_560.jpg	$$\begin{tikzcd} C \arrow[r, "c_y"] \arrow[d, "c_x"'] \arrow[dr, "c_a"] & Y \arrow[d, "g"] \\ X \arrow[r, "f"'] & A \end{tikzcd}$$	$$\begin{tikzcd} C \arrow[r, "c_y"] \arrow[d, "c_x"'] \arrow[dr, "c_a"] & Y \arrow[d, "g"] \\ X \arrow[r, "f"'] & A \end{tikzcd}$$	$$\begin{tikzcd} C \arrow[r, "c_y"] \arrow[d, "c_x"'] \arrow[dr, "c_a"] & Y \arrow[d, "g"] \\ X \arrow[r, "f"'] & A \end{tikzcd}$$
fong-spivak-invitation_DI_128	128	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-128_208_294_652_1026.jpg	$$\begin{tikzcd} X \times_A Y \arrow[r, "c_y"] \arrow[d, "c_x"'] \arrow[dr, phantom, "\lrcorner", very near start] & Y \arrow[d, "g"] \\ X \arrow[r, "f"'] & A \end{tikzcd}$$	$$\begin{tikzcd} X \times_A Y \arrow[r, "c_y"] \arrow[d, "c_x"'] \arrow[dr, phantom, "\lrcorner", very near start] & Y \arrow[d, "g"] \\ X \arrow[r, "f"'] & A \end{tikzcd}$$	$$\begin{tikzcd} X \times_A Y \arrow[r, "c_y"] \arrow[d, "c_x"'] \arrow[dr, phantom, "\lrcorner", very near start] & Y \arrow[d, "g"] \\ X \arrow[r, "f"'] & A \end{tikzcd}$$

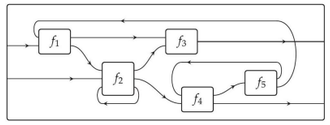
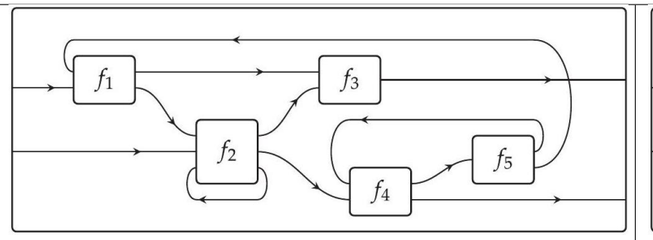
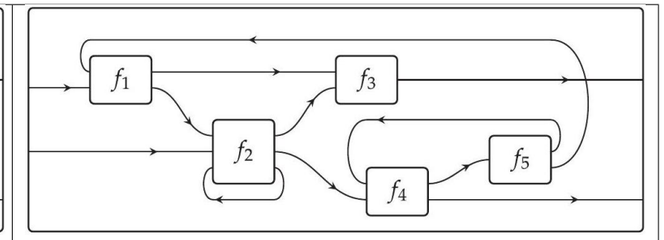
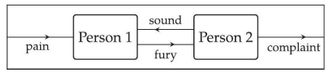
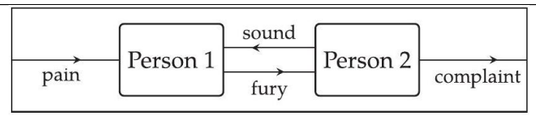
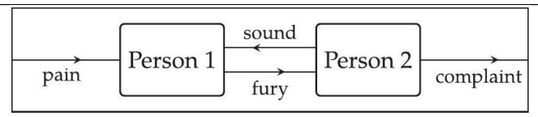
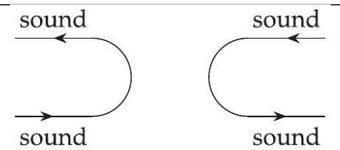
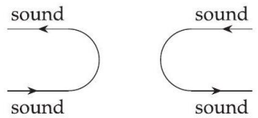
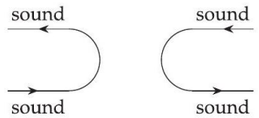
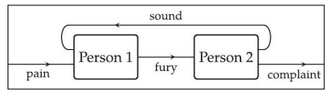
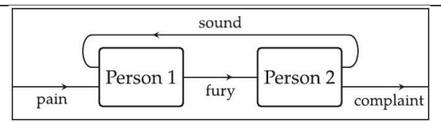
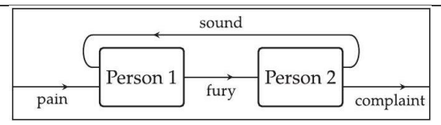
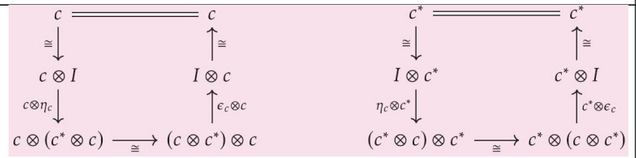
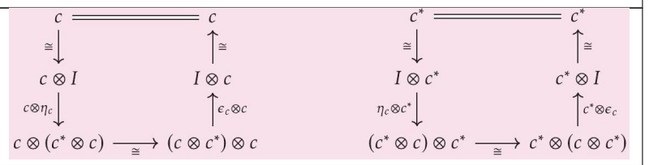
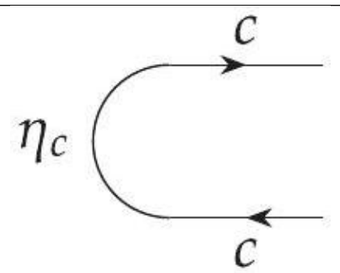
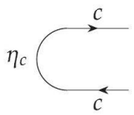
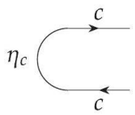
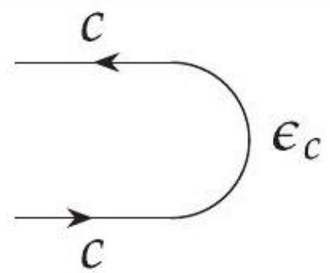
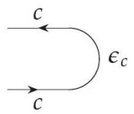
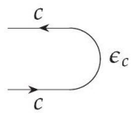
fong-spivak-invitation_DI_2018	128	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-128_512_786_1180_546.jpg			
fong-spivak-invitation_DI_2018	132	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-132_462_1347_652_206.jpg			
fong-spivak-invitation_DI_2018	134	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-134_156_512_1072_560.jpg			
fong-spivak-invitation_DI_2018	134	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-134_152_200_1076_1116.jpg			
fong-spivak-invitation_DI_2018	136	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-136_486_1038_310_422.jpg			
fong-spivak-invitation_DI_2018	137	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-137_366_1014_460_398.jpg			

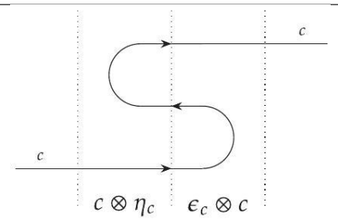
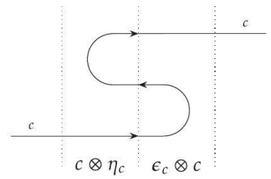
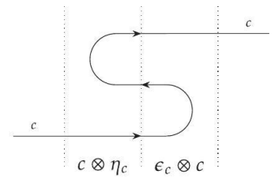
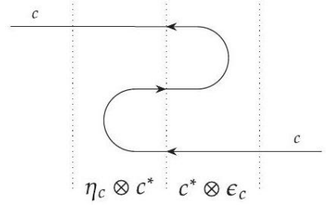
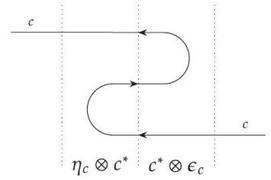
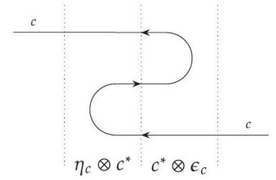
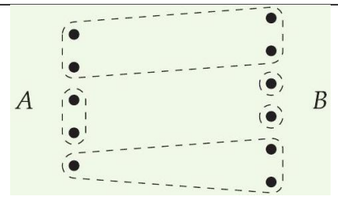
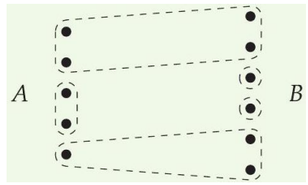
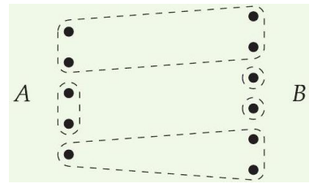
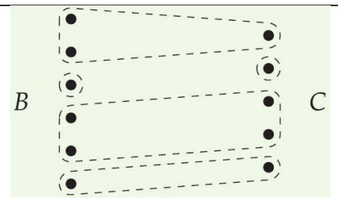
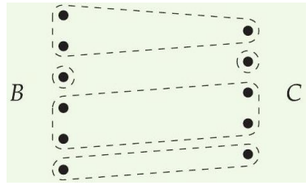
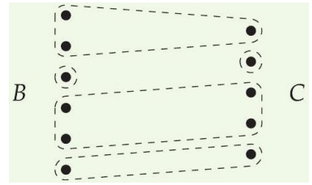
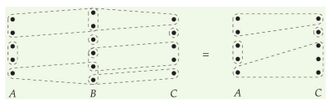
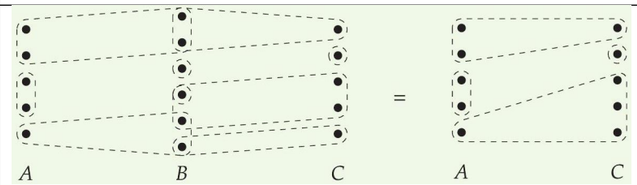
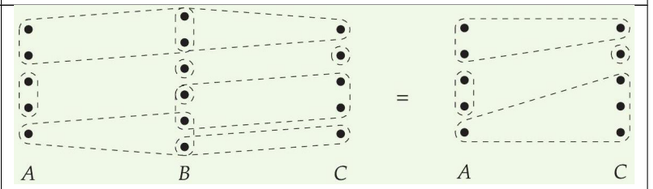
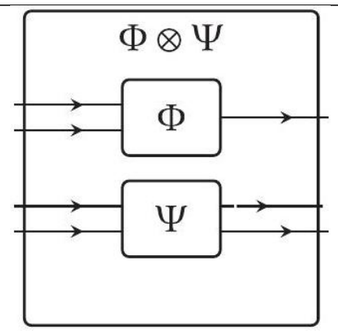
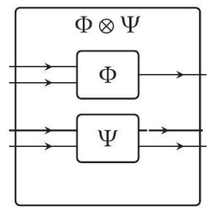
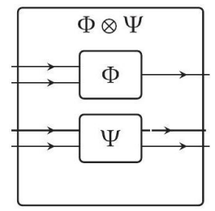
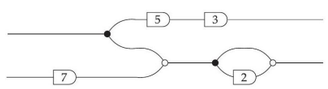
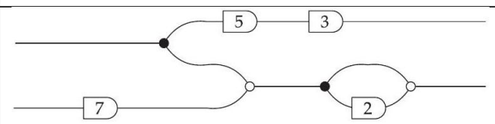
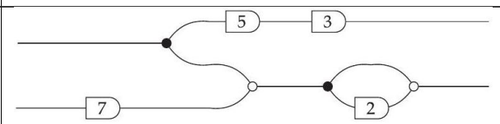
fong-spivak-invitation_DI_0138	138	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-138_194_360_716_760.jpg			
fong-spivak-invitation_DI_0138	138	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-138_112_192_1745_844.jpg			
fong-spivak-invitation_DI_0138	138	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-138_290_318_1979_450.jpg			
fong-spivak-invitation_DI_0138	138	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-138_290_226_1981_846.jpg			

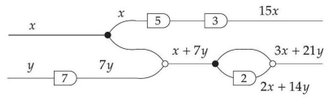
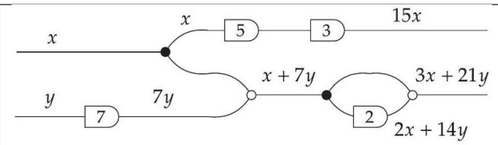
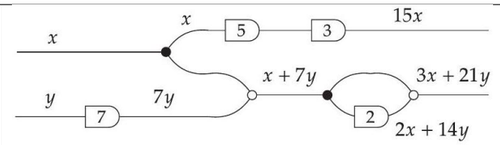
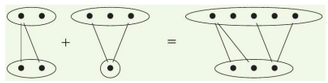
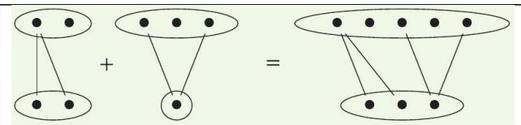
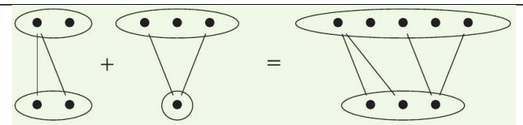
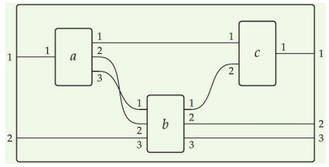
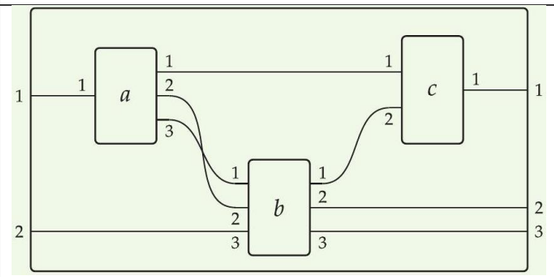
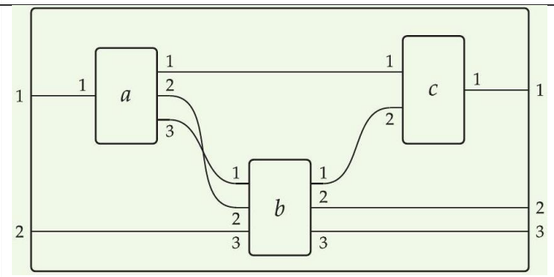
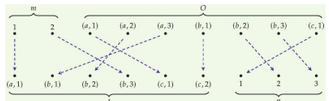
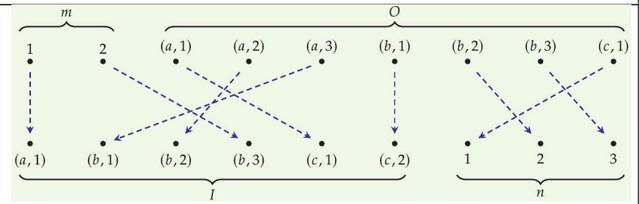
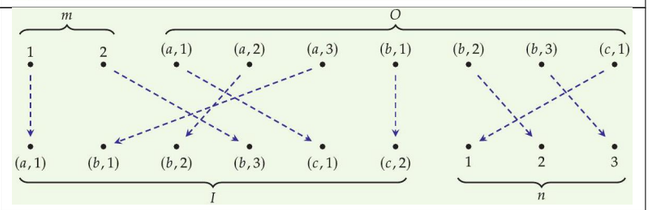
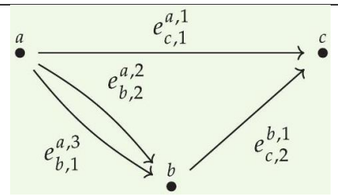
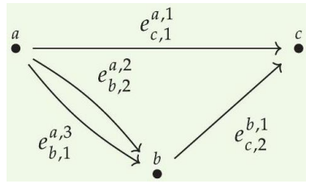
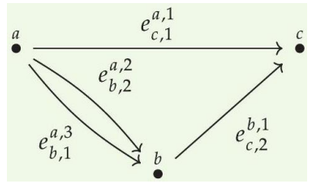
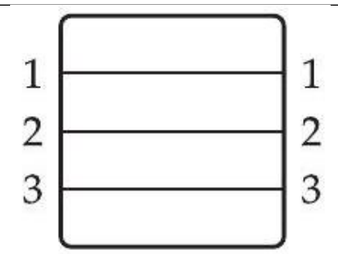
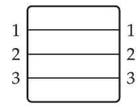
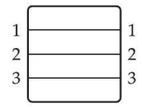
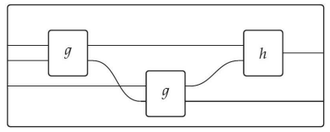
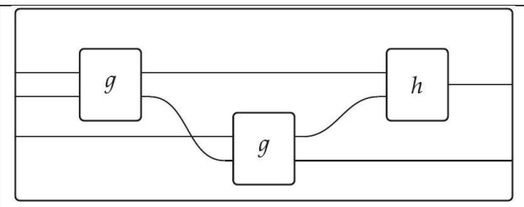
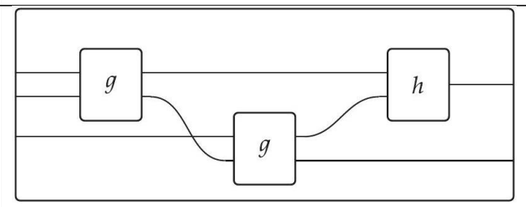
fong-spivak-invitation_DI_4x3	138	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-138_354_214_1949_1213.jpg			
fong-spivak-invitation_DI_4x3	139	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-139_422_992_364_440.jpg			
fong-spivak-invitation_DI_4x3	140	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-140_406_1090_258_362.jpg			
fong-spivak-invitation_DI_4x3	141	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-141_350_1116_686_380.jpg			
fong-spivak-invitation_DI_4x3	142	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-142_344_1225_744_330.jpg			
fong-spivak-invitation_DI_4x3	143	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-143_104_700_1144_588.jpg			

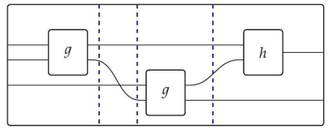
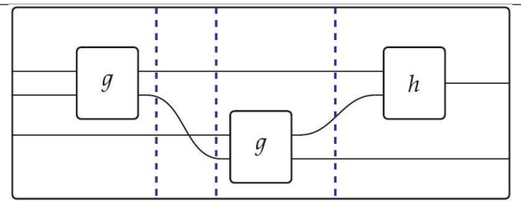
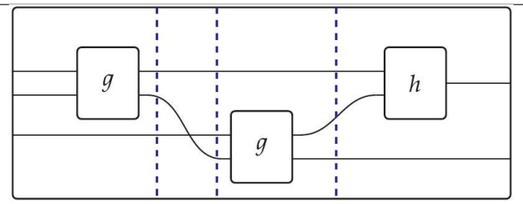
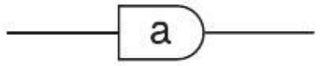
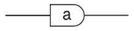
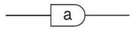
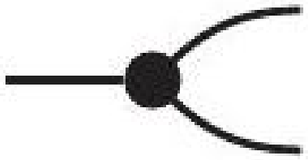
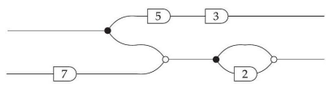
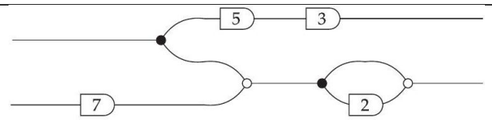
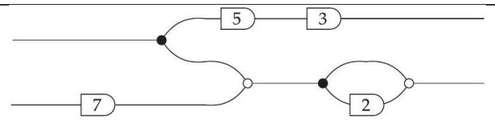
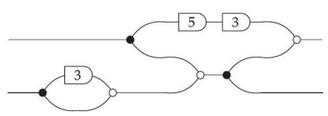
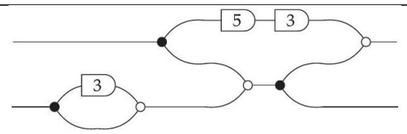
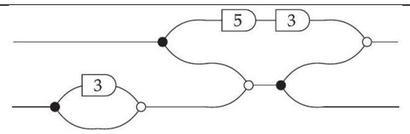
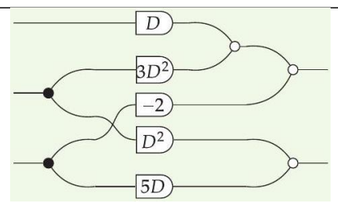
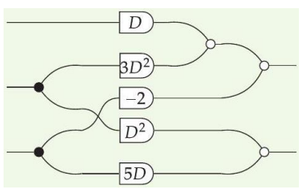
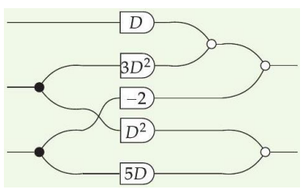
fong-spivak-invitation_DI_4b3	143	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-143_418_1221_1439_330.jpg			
fong-spivak-invitation_DI_4b4	144	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-144_312_900_1581_488.jpg			
fong-spivak-invitation_DI_4b5	146	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-146_312_758_792_562.jpg			
fong-spivak-invitation_DI_4b6	146	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-146_342_944_1969_468.jpg			
fong-spivak-invitation_DI_4b7	147	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-147_586_860_1369_508.jpg			
fong-spivak-invitation_DI_4b8	148	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-148_90_142_972_870.jpg			
fong-spivak-invitation_DI_4b9	148	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-148_88_376_1200_752.jpg			

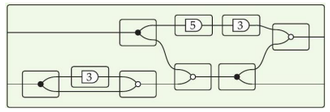
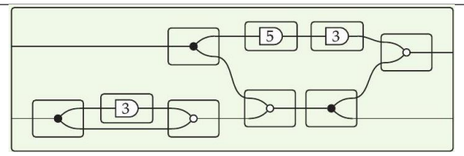
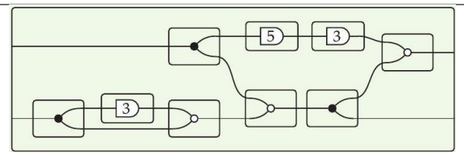
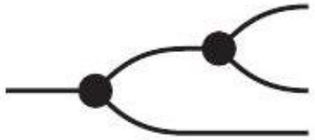
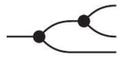
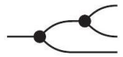
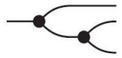
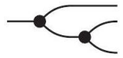
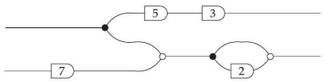
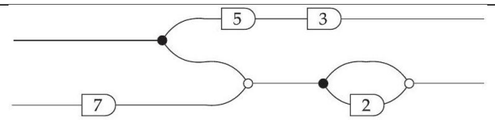
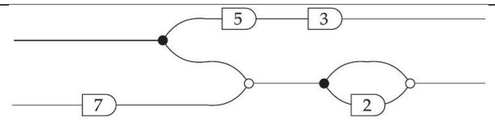
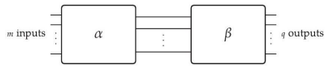
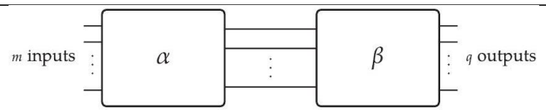
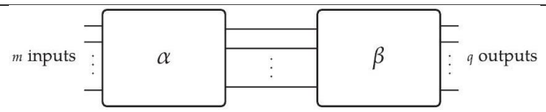
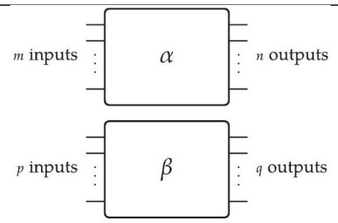
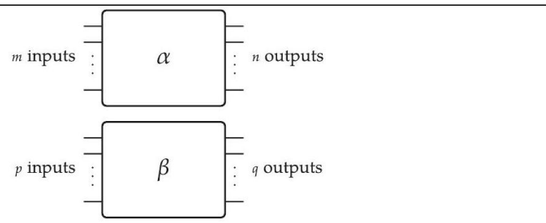
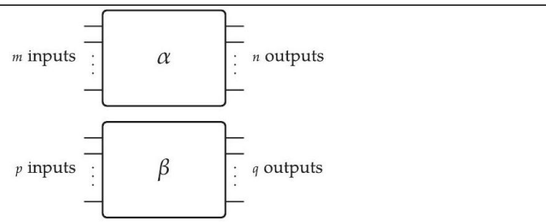
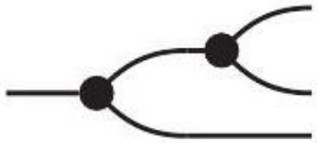
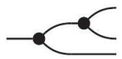
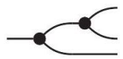
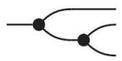
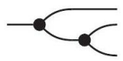
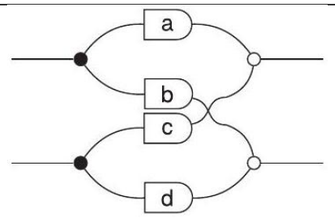
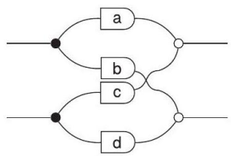
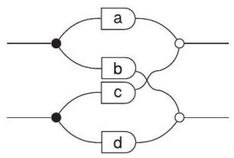
fong-spivak-invitation_DI_148	148	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-148_136_404_1621_738.jpg			
fong-spivak-invitation_DI_148	148	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-148_104_374_1933_754.jpg			
fong-spivak-invitation_DI_149	149	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-149_64_104_476_542.jpg			
fong-spivak-invitation_DI_149	149	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-149_64_102_476_888.jpg			
fong-spivak-invitation_DI_149	149	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-149_30_104_492_1231.jpg			
fong-spivak-invitation_DI_149	149	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-149_106_828_730_524.jpg			
fong-spivak-invitation_DI_149	149	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-149_210_404_1211_736.jpg			
fong-spivak-invitation_DI_149	149	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-149_212_404_1617_736.jpg			
fong-spivak-invitation_DI_149	149	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-149_260_596_1981_640.jpg			
fong-spivak-invitation_DI_152	152	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-152_264_596_776_642.jpg			

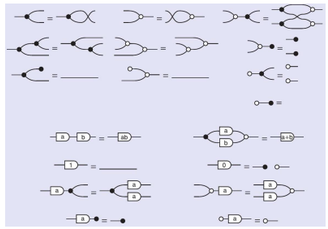
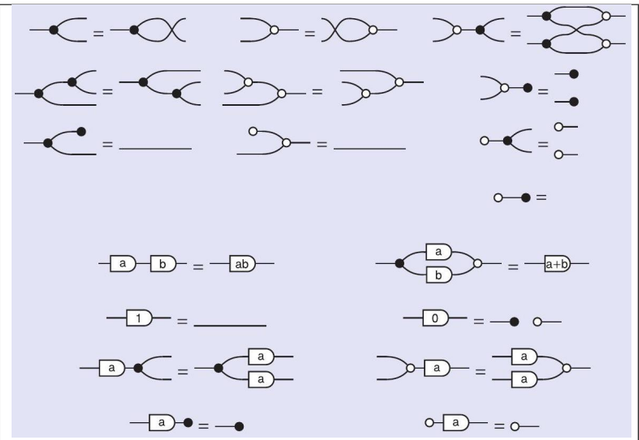
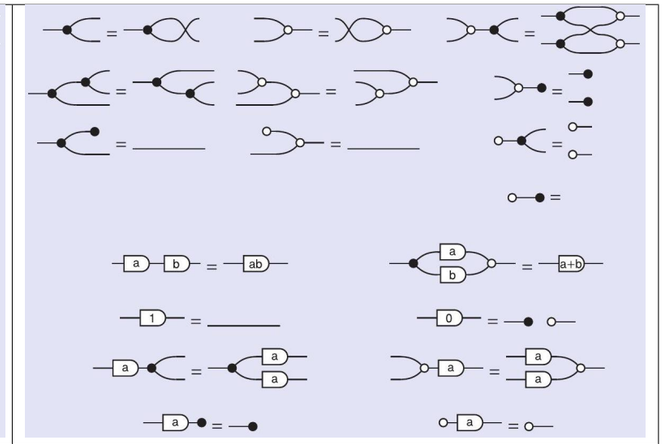
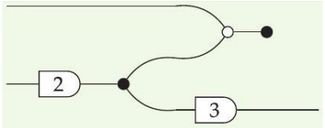
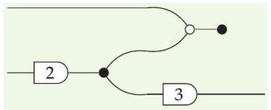
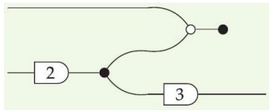
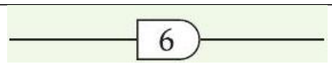
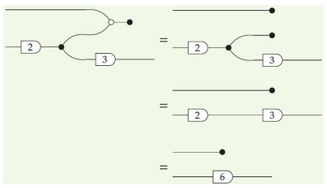
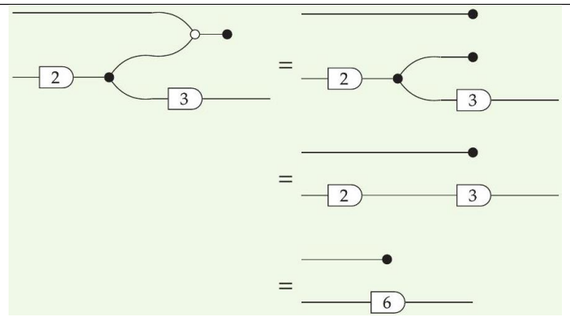
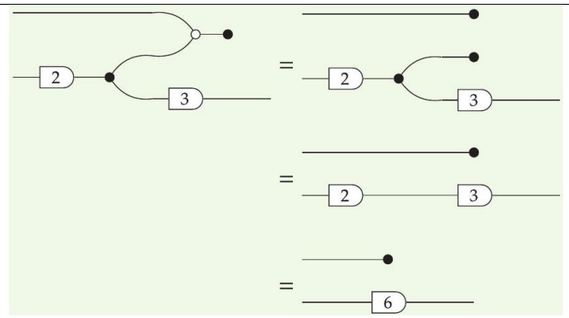
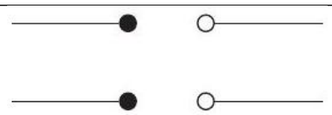
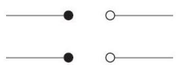
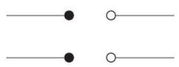
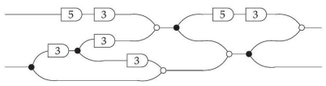
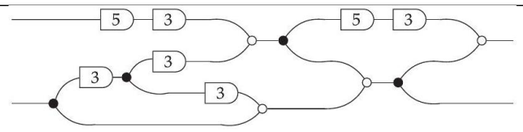
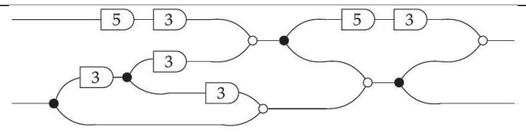
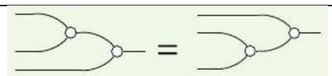
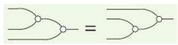
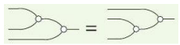
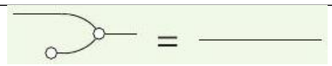
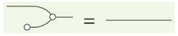
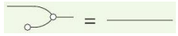
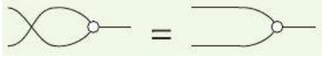
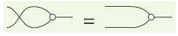
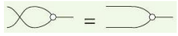
fong-spivak-invitation_DI_154	154	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-154_368_994_596_418.jpg			
fong-spivak-invitation_DI_154	154	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-154_176_836_1633_498.jpg			
fong-spivak-invitation_DI_154	154	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-154_186_406_2063_738.jpg			
fong-spivak-invitation_DI_155	155	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-155_184_676_338_600.jpg			
fong-spivak-invitation_DI_155	155	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-155_274_1126_1395_374.jpg			
fong-spivak-invitation_DI_155	155	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-155_174_206_2113_592.jpg			
fong-spivak-invitation_DI_155	155	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-155_176_202_2111_1082.jpg			

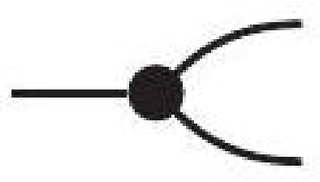
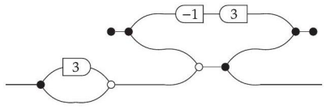
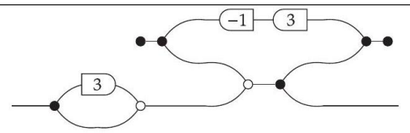
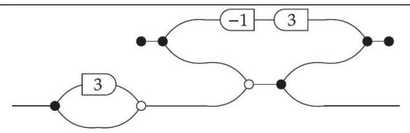
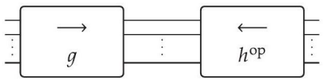
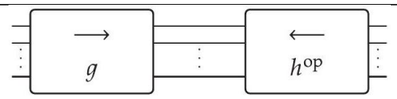
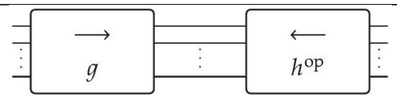
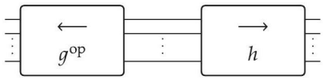
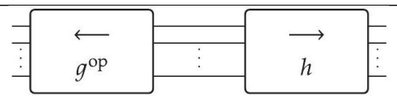
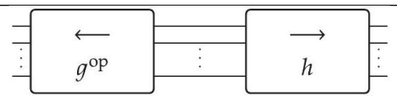
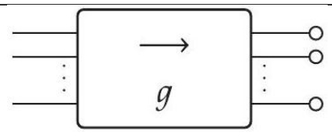
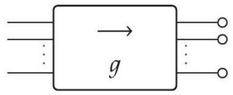
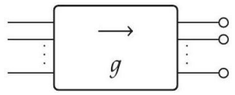
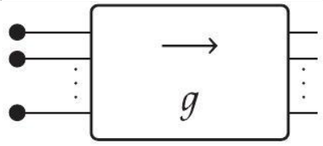
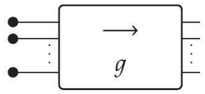
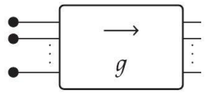
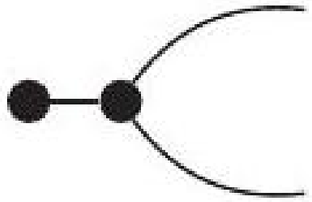
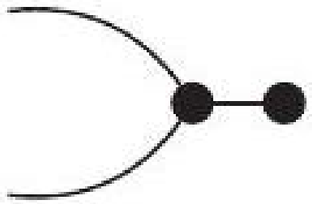
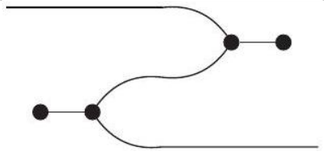
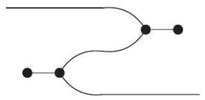
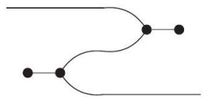
fong-spivak-invitation_DI_156	156	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-156_284_420_360_400.jpg			
fong-spivak-invitation_DI_156	156	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-156_286_420_358_1060.jpg			
fong-spivak-invitation_DI_156	156	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-156_286_480_1945_700.jpg			
fong-spivak-invitation_DI_157	157	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-157_287_479_505_699.jpg			
fong-spivak-invitation_DI_157	157	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-157_338_1174_885_352.jpg			
fong-spivak-invitation_DI_158	158	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-158_328_322_1417_778.jpg			
fong-spivak-invitation_DI_161	161	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-161_186_767_1826_556.jpg			

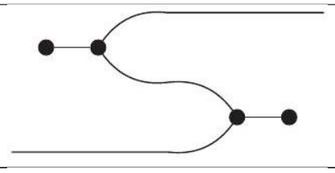
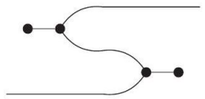
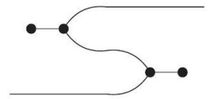
fong-spivak-invitation_DI_162	162	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-162_224_770_542_556.jpg			
fong-spivak-invitation_DI_164	164	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-164_192_806_1402_540.jpg			
fong-spivak-invitation_DI_165	165	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-165_432_858_1853_510.jpg			
fong-spivak-invitation_DI_166	166	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-166_376_1186_552_348.jpg			
fong-spivak-invitation_DI_166	166	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-166_284_480_1020_700.jpg			
fong-spivak-invitation_DI_167	167	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-167_166_212_414_832.jpg			
fong-spivak-invitation_DI_170	170	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-170_316_808_438_536.jpg			

fong-spivak-invitation_DI1_p172	172	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-172_314_808_422_536.jpg			
fong-spivak-invitation_DI1_p174	174	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-174_46_205_2080_840.jpg			
fong-spivak-invitation_DI1_p175	175	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-175_62_764_470_556.jpg			
fong-spivak-invitation_DI1_p175	175	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-175_64_112_652_884.jpg			
fong-spivak-invitation_DI1_p175	175	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-175_30_72_912_902.jpg			
fong-spivak-invitation_DI1_p175	175	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-175_62_112_1126_882.jpg			
fong-spivak-invitation_DI1_p175	175	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-175_28_72_1329_902.jpg			
fong-spivak-invitation_DI1_p175	175	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-175_184_764_1679_556.jpg			
fong-spivak-invitation_DI1_p176	176	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-176_204_630_682_626.jpg			
fong-spivak-invitation_DI1_p176	176	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-176_286_474_1733_704.jpg			

fong-spivak-invitation_DIL_0198	177	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-177_236_716_1028_580.jpg			
fong-spivak-invitation_DIL_0199	177	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-177_88_186_1793_648.jpg			
fong-spivak-invitation_DIL_0200	177	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-177_86_186_1795_1042.jpg			
fong-spivak-invitation_DIL_0201	179	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-179_184_768_452_554.jpg			
fong-spivak-invitation_DIL_0202	181	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-181_166_852_338_512.jpg			
fong-spivak-invitation_DIL_0203	181	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-181_344_508_1261_684.jpg			
fong-spivak-invitation_DIL_0204	181	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-181_86_184_2087_868.jpg			
fong-spivak-invitation_DIL_0205	182	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-182_86_186_332_870.jpg			
fong-spivak-invitation_DIL_0206	183	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-183_242_364_996_756.jpg			

fong-spivak-invitation_DI_184	184	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-184_816_1170_616_358.jpg			
fong-spivak-invitation_DI_185	185	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-185_172_424_376_526.jpg			
fong-spivak-invitation_DI_185	185	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-185_28_152_438_1068.jpg			
fong-spivak-invitation_DI_185	185	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-185_50_280_492_1070.jpg			
fong-spivak-invitation_DI_185	185	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-185_498_888_678_494.jpg			
fong-spivak-invitation_DI_185	185	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-185_94_276_1781_332.jpg			
fong-spivak-invitation_DI_185	185	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-185_198_814_1729_738.jpg			
fong-spivak-invitation_DI_186	186	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-186_62_278_2075_394.jpg			
fong-spivak-invitation_DI_186	186	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-186_50_274_2157_396.jpg			
fong-spivak-invitation_DI_186	186	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-186_50_276_2223_396.jpg			

fong-spivak-invitation_DI1_0188	188	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-188_66_114_1194_886.jpg			
fong-spivak-invitation_DI1_0189	189	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-189_204_628_564_624.jpg			
fong-spivak-invitation_DI1_0190	190	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-190_146_612_624_636.jpg			
fong-spivak-invitation_DI1_0190	190	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-190_144_610_1112_636.jpg			
fong-spivak-invitation_DI1_0190	190	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-190_144_364_2019_780.jpg			
fong-spivak-invitation_DI1_0191	191	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-191_146_320_336_800.jpg			
fong-spivak-invitation_DI1_0191	191	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-191_80_120_2037_636.jpg			
fong-spivak-invitation_DI1_0191	191	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-191_82_120_2037_1120.jpg			
fong-spivak-invitation_DI1_0192	192	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-192_150_318_470_360.jpg			

fong-spivak-invitation_DI1_192	— (dup)	05b3e583-fc72-4ff5-9914-6f882b9df5b5-192_154_318_470_816.jpg			
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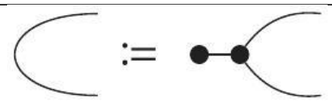
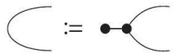
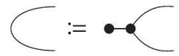
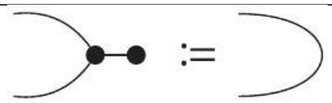
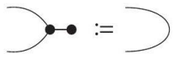
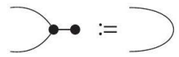
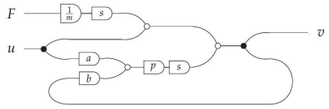
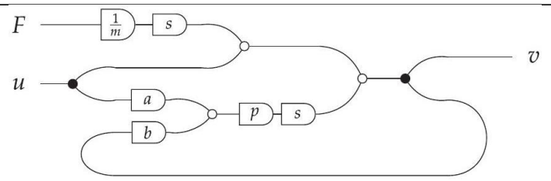
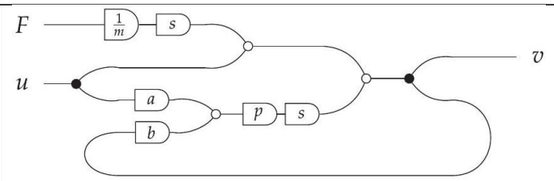
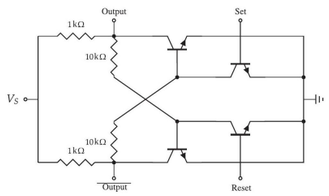
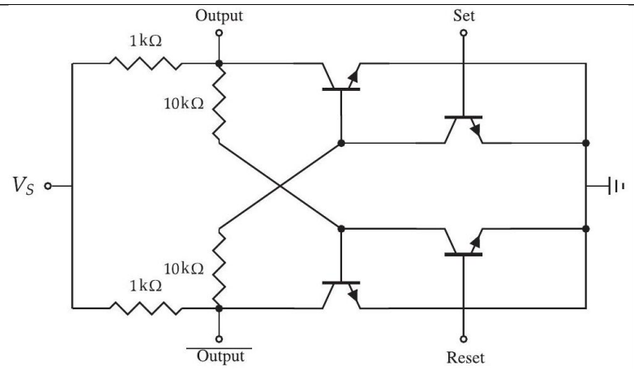
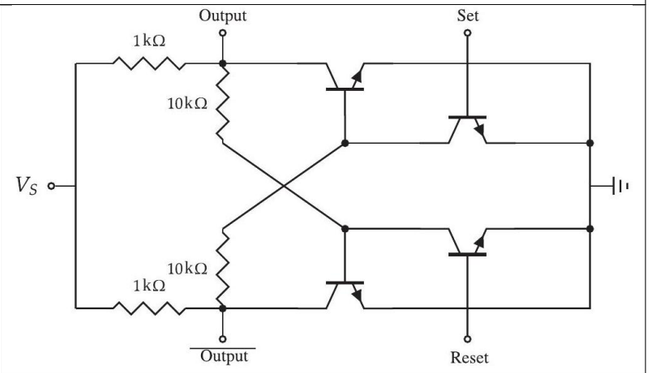
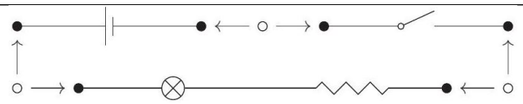
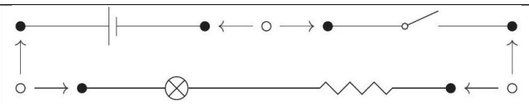
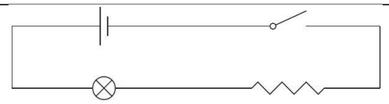
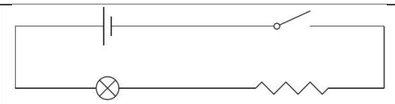
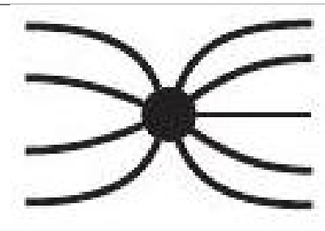
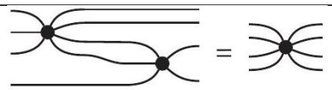
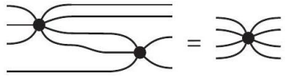
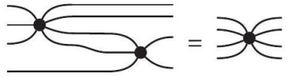
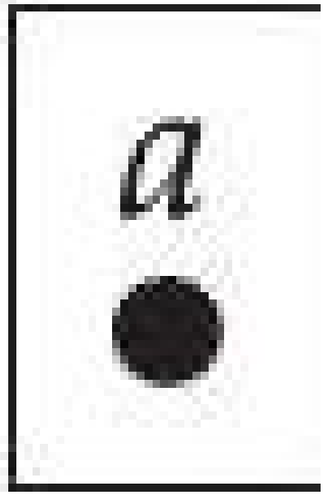
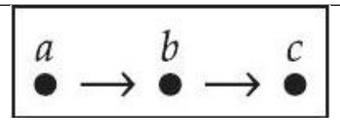
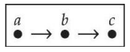
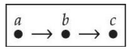
fong-spivak-invitation_DI1_192	— (dup)	05b3e583-fc72-4ff5-9914-6f882b9df5b5-192_84_272_1048_488.jpg			
fong-spivak-invitation_DI1_192	— (dup)	05b3e583-fc72-4ff5-9914-6f882b9df5b5-192_84_270_1048_1122.jpg			
fong-spivak-invitation_DI1_192	— (dup)	05b3e583-fc72-4ff5-9914-6f882b9df5b5-192_280_856_1693_512.jpg			
fong-spivak-invitation_DI1_194	— (dup)	05b3e583-fc72-4ff5-9914-6f882b9df5b5-194_584_998_1044_442.jpg			
fong-spivak-invitation_DI1_195	— (dup)	05b3e583-fc72-4ff5-9914-6f882b9df5b5-195_158_772_662_552.jpg			
fong-spivak-invitation_DI1_195	— (dup)	05b3e583-fc72-4ff5-9914-6f882b9df5b5-195_156_814_1301_532.jpg			
fong-spivak-invitation_DI1_195	— (dup)	05b3e583-fc72-4ff5-9914-6f882b9df5b5-195_156_816_1669_532.jpg			
fong-spivak-invitation_DI1_195	— (dup)	05b3e583-fc72-4ff5-9914-6f882b9df5b5-195_156_600_1991_638.jpg			

fong-spivak-invitation_DI_196	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-196_80_116_1653_884.jpg			
fong-spivak-invitation_DI_196	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-196_118_452_1969_716.jpg			
fong-spivak-invitation_DI_198	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-198_64_40_2071_386.jpg			
fong-spivak-invitation_DI_198	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-198_68_194_2067_646.jpg			
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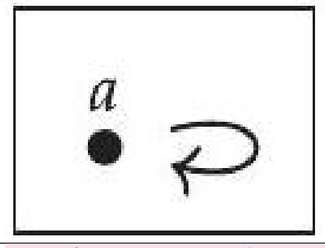
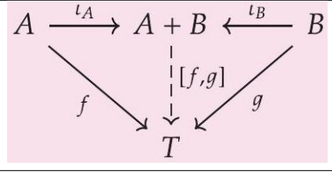
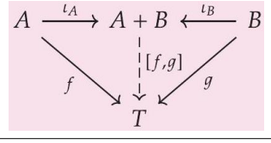
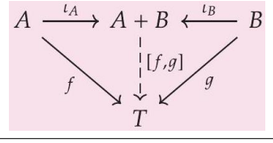
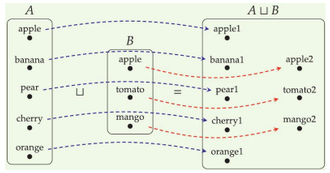
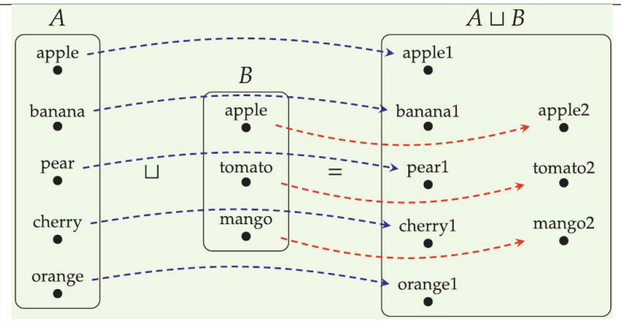
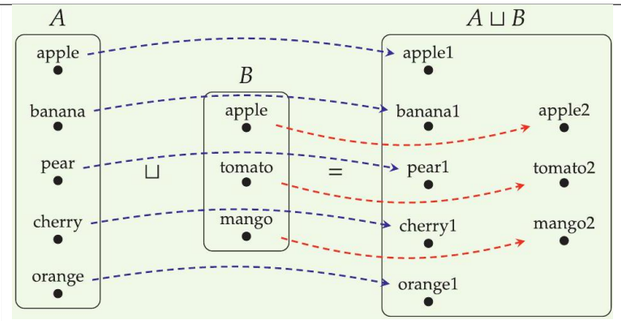
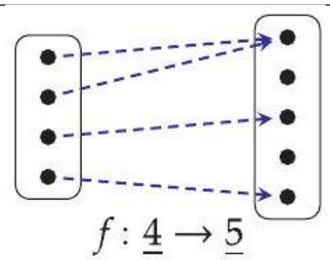
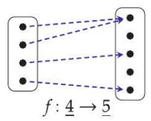
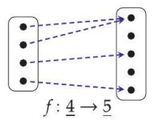
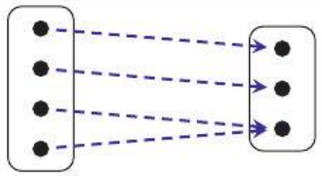
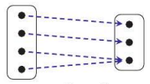
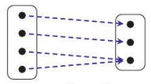
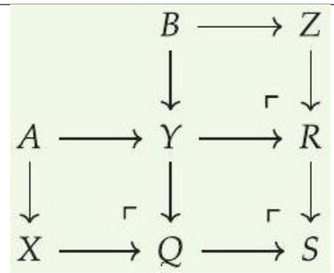
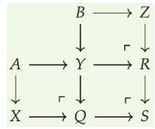
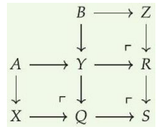
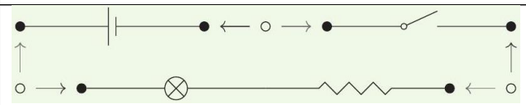
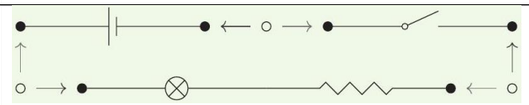
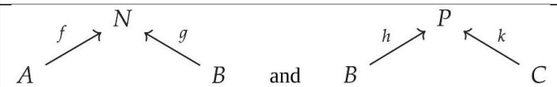
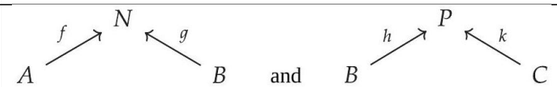
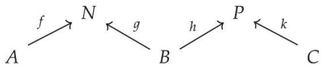
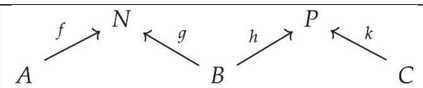
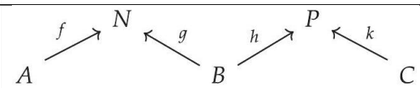
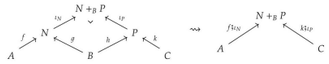
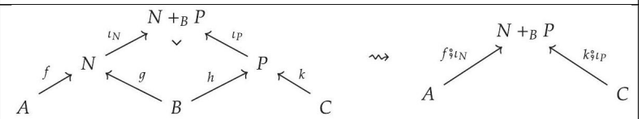
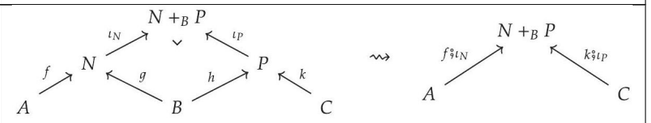
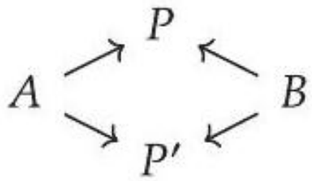
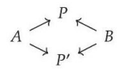
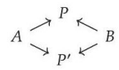
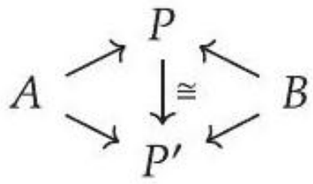
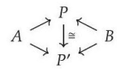
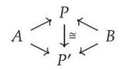
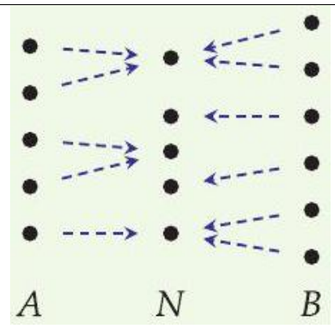
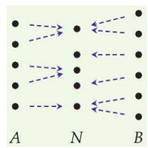
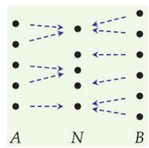
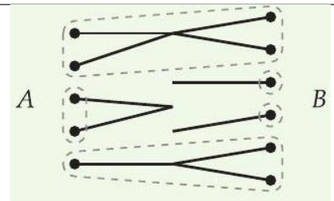
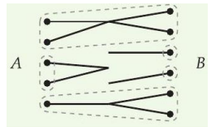
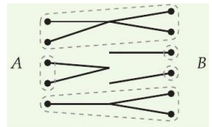
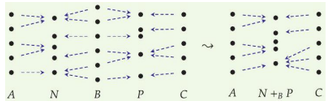
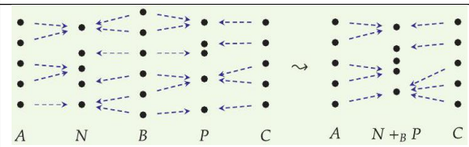
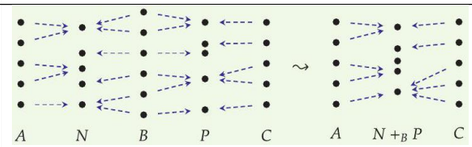
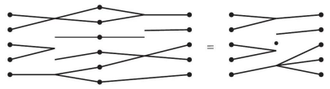
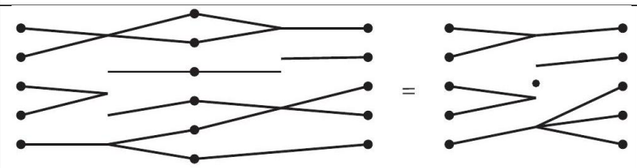
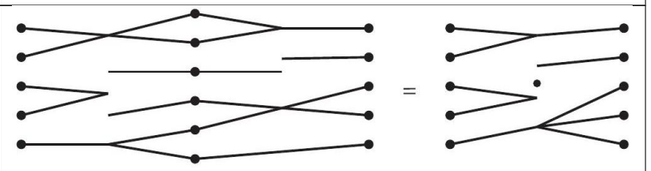
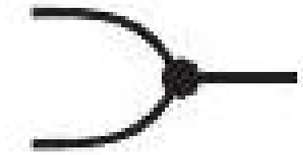
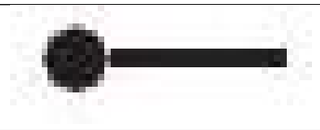
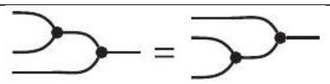
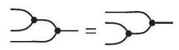
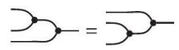
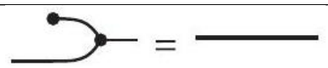
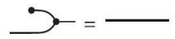
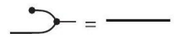
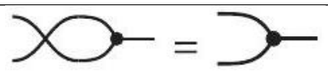
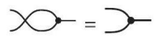
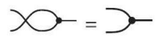
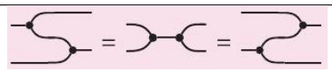
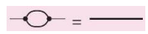
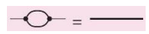
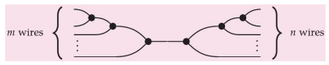
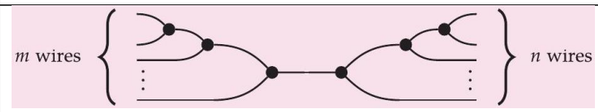
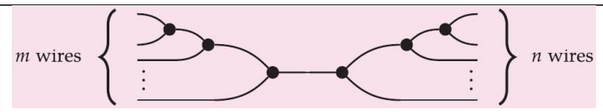
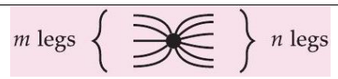
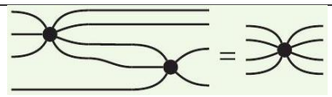
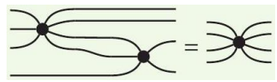
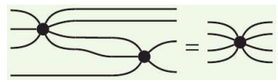
fong-spivak-invitation_DI_198	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-198_92_124_2057_1405.jpg			
fong-spivak-invitation_DI_199	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-199_208_410_1685_732.jpg			

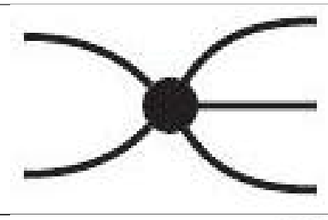
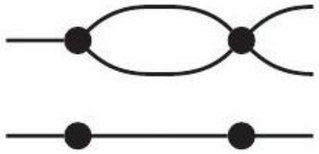
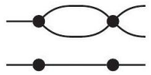
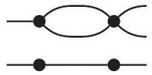
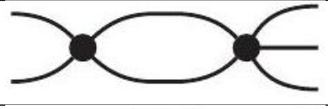
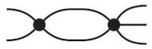
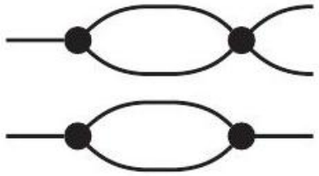
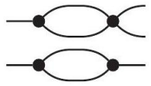
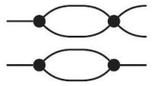
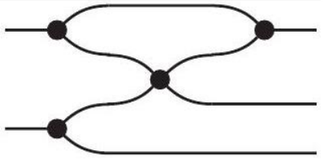
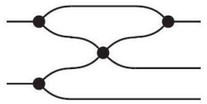
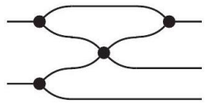
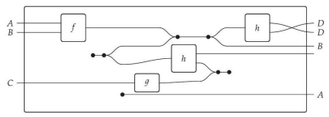
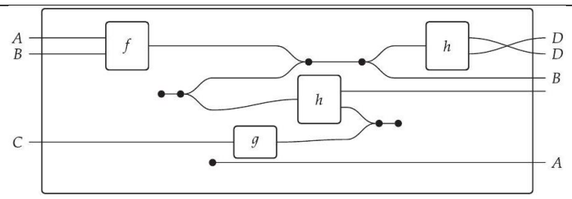
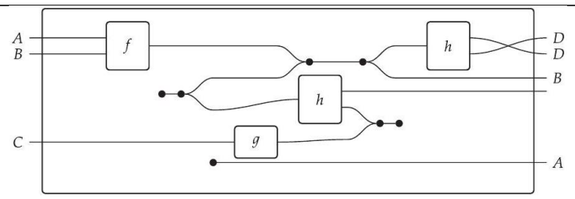
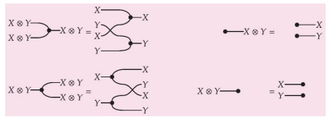
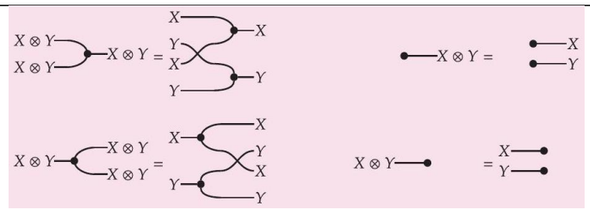
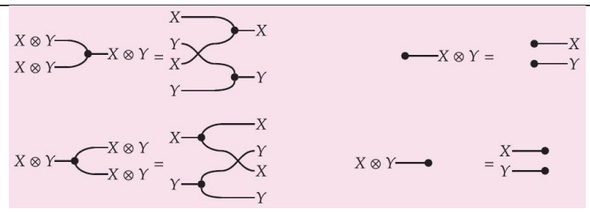
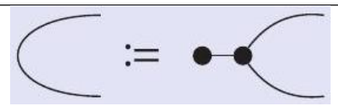
fong-spivak-invitation_DI_0200	200	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-200_504_964_448_424.jpg			
fong-spivak-invitation_DI_0201	201	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-201_184_180_1227_848.jpg	$\begin{tikzcd} A \arrow[r, "f"] \arrow[d, "g"'] & X \\ Y & \end{tikzcd}$	$\begin{tikzcd} A \arrow[r, "f"] \arrow[d, "g"'] & X \\ Y & \end{tikzcd}$	$\begin{tikzcd} A \arrow[r, "f"] \arrow[d, "g"'] & X \\ Y & \end{tikzcd}$
fong-spivak-invitation_DI_0201	201	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-201_202_298_1661_818.jpg	$\begin{tikzcd} A \arrow[r, "f"] \arrow[d, "g"'] & X \arrow[d, "\iota_X"] \\ Y \arrow[r, "\iota_Y"'] & X +_A Y \arrow[ul, phantom, "\ulcorner", very near start] \end{tikzcd}$	$\begin{tikzcd} A \arrow[r, "f"] \arrow[d, "g"'] & X \arrow[d, "\iota_X"] \\ Y \arrow[r, "\iota_Y"'] & X +_A Y \arrow[ul, phantom, "\ulcorner", very near start] \end{tikzcd}$	$\begin{tikzcd} A \arrow[r, "f"] \arrow[d, "g"'] & X \arrow[d, "\iota_X"] \\ Y \arrow[r, "\iota_Y"'] & X +_A Y \arrow[ul, phantom, "\ulcorner", very near start] \end{tikzcd}$
fong-spivak-invitation_DI_0201	201	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-201_204_214_2023_860.jpg	$\begin{tikzcd} A \arrow[r, "f"] \arrow[d, "g"'] & X \arrow[d, "x"] \\ Y \arrow[r, "y"'] & T \end{tikzcd}$	$\begin{tikzcd} A \arrow[r, "f"] \arrow[d, "g"'] & X \arrow[d, "x"] \\ Y \arrow[r, "y"'] & T \end{tikzcd}$	$\begin{tikzcd} A \arrow[r, "f"] \arrow[d, "g"'] & X \arrow[d, "x"] \\ Y \arrow[r, "y"'] & T \end{tikzcd}$
fong-spivak-invitation_DI_0202	202	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-202_294_400_256_768.jpg	$\begin{tikzcd} A \arrow[r, "f"] \arrow[d, "g"'] & X \arrow[d, "\iota_X"] \arrow[ddr, bend left, "x"] & \\ Y \arrow[r, "\iota_Y"] \arrow[drr, bend right, "y"'] & X +_A Y \arrow[dr, dashed, "t"] & \\ & & T \end{tikzcd}$	$\begin{tikzcd} A \arrow[r, "f"] \arrow[d, "g"'] & X \arrow[d, "\iota_X"] \arrow[ddr, bend left, "x"] & \\ Y \arrow[r, "\iota_Y"] \arrow[drr, bend right, "y"'] & X +_A Y \arrow[dr, dashed, "t"] & \\ & & T \end{tikzcd}$	$\begin{tikzcd} A \arrow[r, "f"] \arrow[d, "g"'] & X \arrow[d, "\iota_X"] \arrow[ddr, bend left, "x"] & \\ Y \arrow[r, "\iota_Y"] \arrow[drr, bend right, "y"'] & X +_A Y \arrow[dr, dashed, "t"] & \\ & & T \end{tikzcd}$

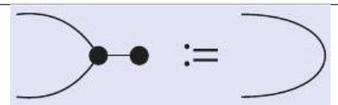
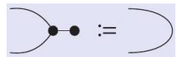
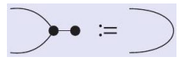
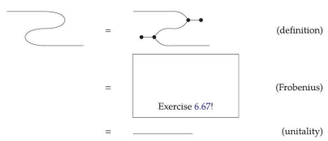
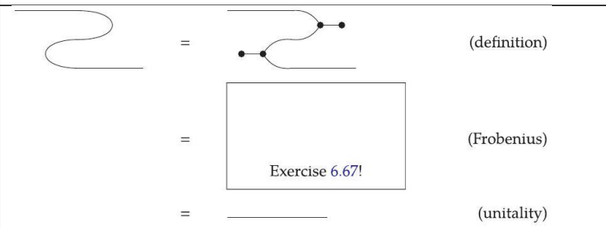
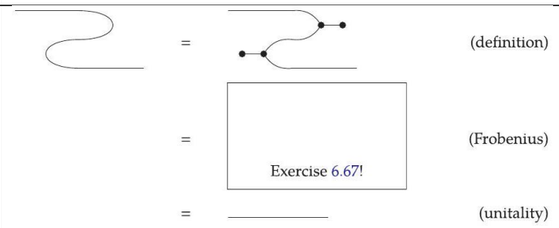
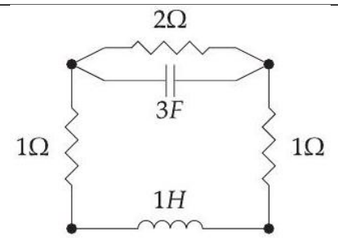
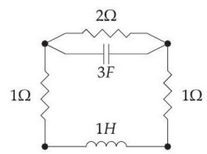
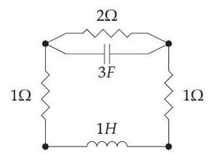
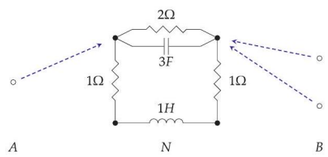
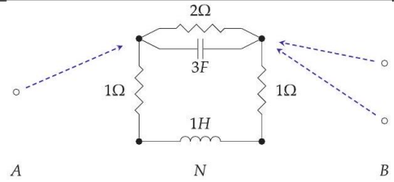
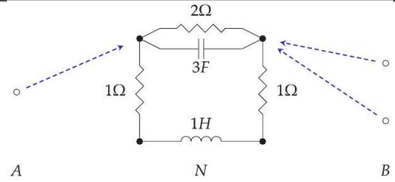
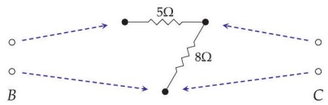
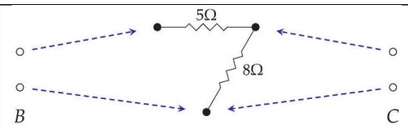
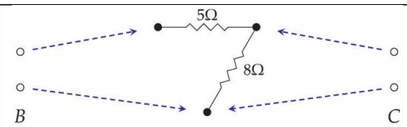
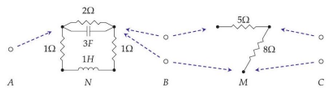
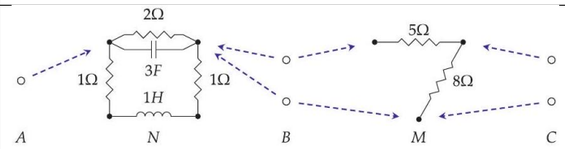
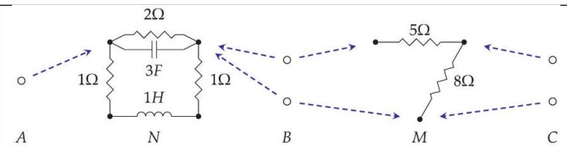
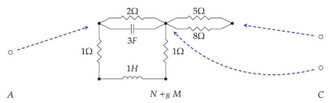
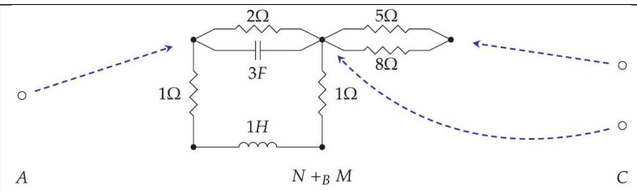
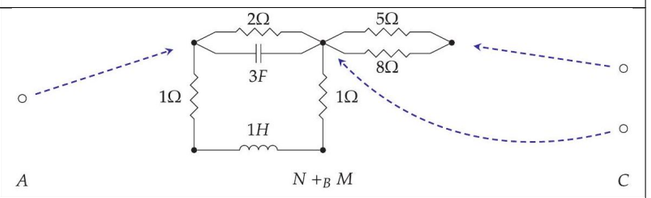
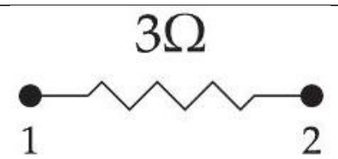
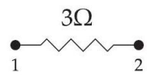
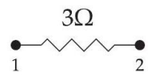
fong-spivak-invitation_DI_202	202	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-202_210_220_1217_832.jpg	$\begin{tikzcd} A \arrow[r, "f"] \arrow[d, "i"'] & X \arrow[d, "j"] \\ A' \arrow[r, "f'"'] \arrow[ur, phantom, "\ulcorner"] & X' \end{tikzcd}$	$\begin{tikzcd} A \arrow[r, "f"] \arrow[d, "i"'] & X \arrow[d, "j"] \\ A' \arrow[r, "f'"'] \arrow[ur, phantom, "\ulcorner"] & X' \end{tikzcd}$	$\begin{tikzcd} A \arrow[r, "f"] \arrow[d, "i"'] & X \arrow[d, "j"] \\ A' \arrow[r, "f'"'] \arrow[ur, phantom, "\ulcorner"] & X' \end{tikzcd}$
fong-spivak-invitation_DI_202	202	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-202_198_216_1565_832.jpg	$\begin{tikzcd} A \arrow[r, "f"] \arrow[d, "i"'] & X \arrow[d, "x"] \\ A' \arrow[r, "a"'] & T \end{tikzcd}$	$\begin{tikzcd} A \arrow[r, "f"] \arrow[d, "i"'] & X \arrow[d, "x"] \\ A' \arrow[r, "a"'] & T \end{tikzcd}$	$\begin{tikzcd} A \arrow[r, "f"] \arrow[d, "i"'] & X \arrow[d, "x"] \\ A' \arrow[r, "a"'] & T \end{tikzcd}$
fong-spivak-invitation_DI_202	202	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-202_284_316_1913_784.jpg	$\begin{tikzcd} A \arrow[r, "f"] \arrow[d, "i"'] & X \arrow[d, "j"] \arrow[ddd, bend left, "x"] \\ A' \arrow[r, "f'"'] \arrow[dr, bend right, "a"'] & X' \arrow[d, dashed, "x'"] \\ & T \end{tikzcd}$	$\begin{tikzcd} A \arrow[r, "f"] \arrow[d, "i"'] & X \arrow[d, "j"] \arrow[ddd, bend left, "x"] \\ A' \arrow[r, "f'"'] \arrow[dr, bend right, "a"'] & X' \arrow[d, dashed, "x'"] \\ & T \end{tikzcd}$	$\begin{tikzcd} A \arrow[r, "f"] \arrow[d, "i"'] & X \arrow[d, "j"] \arrow[ddd, bend left, "x"] \\ A' \arrow[r, "f'"'] \arrow[dr, bend right, "a"'] & X' \arrow[d, dashed, "x'"] \\ & T \end{tikzcd}$
fong-spivak-invitation_DI_203	203	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-203_184_230_1024_582.jpg	 $f : \underline{4} \to \underline{5}$	 $f : \underline{4} \to \underline{5}$	 $f : \underline{4} \to \underline{5}$
fong-spivak-invitation_DI_203	203	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-203_164_228_1040_1064.jpg	 $g : \underline{4} \to \underline{3}$	 $g : \underline{4} \to \underline{3}$	 $g : \underline{4} \to \underline{3}$

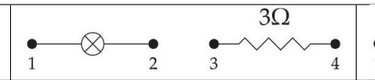
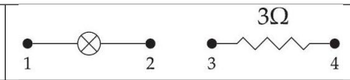
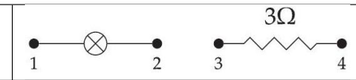
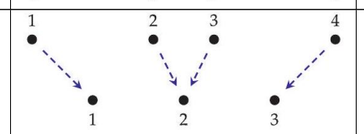
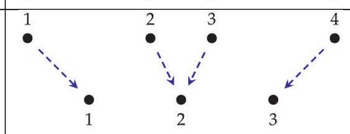
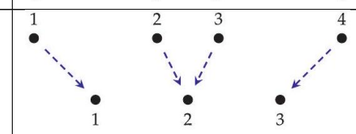
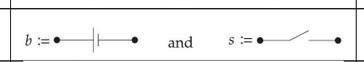
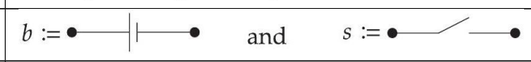
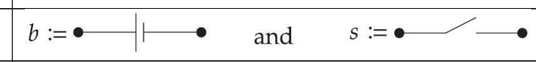
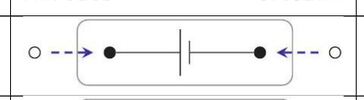
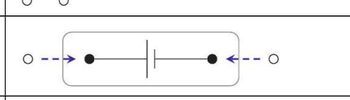
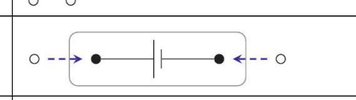
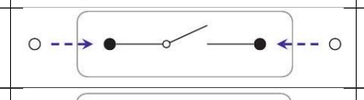
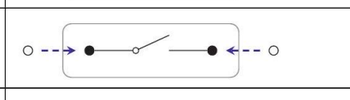
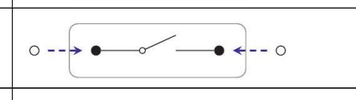
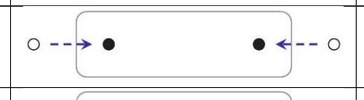
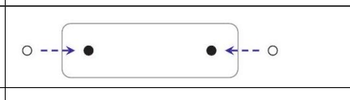
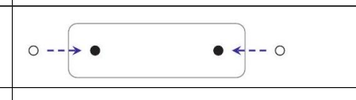
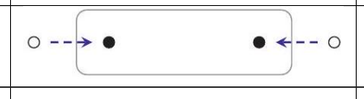
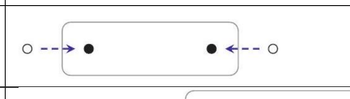
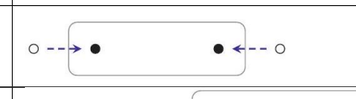
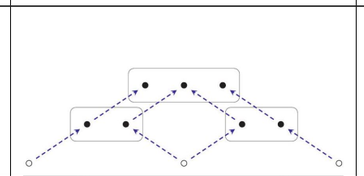
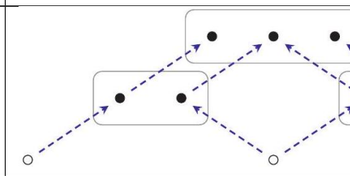
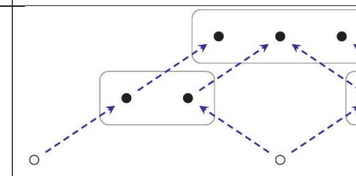
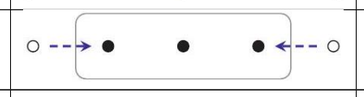
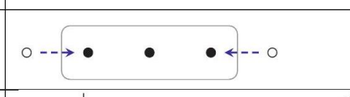
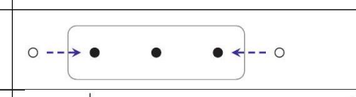
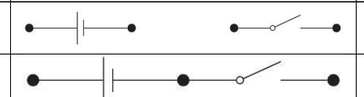
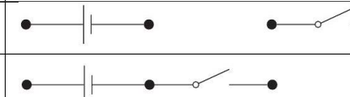
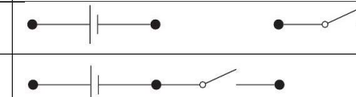
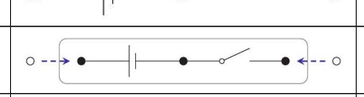
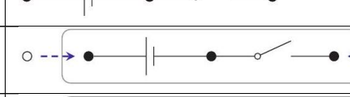
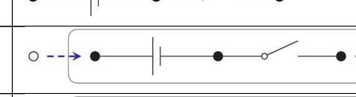
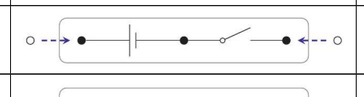
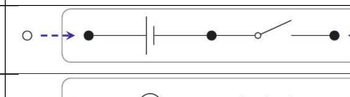
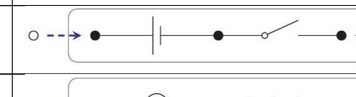
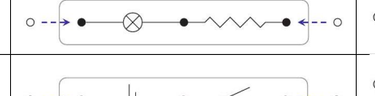
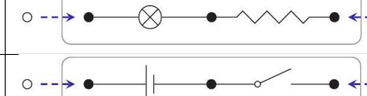
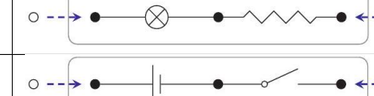
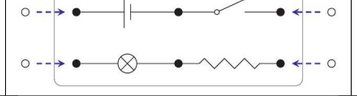
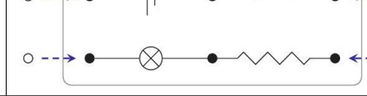
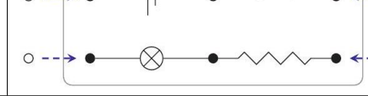
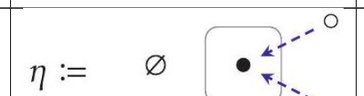
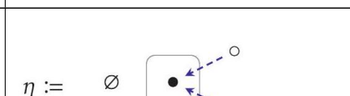
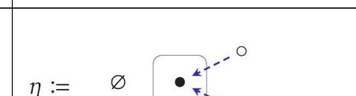
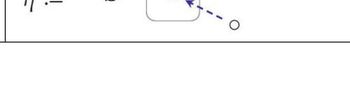
fong-spivak-invitation_DI_0203	203	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-203_200_274_1653_574.jpg	$\begin{tikzcd} \varnothing \arrow[r, "f"] \arrow[d, "g"'] & X \arrow[d, "\iota_X"] \\ Y \arrow[r, "\iota_Y"'] & X + Y \end{tikzcd}$	$\begin{tikzcd} \varnothing \arrow[r, "f"] \arrow[d, "g"'] & X \arrow[d, "\iota_X"] \\ Y \arrow[r, "\iota_Y"'] & X + Y \end{tikzcd}$	$\begin{tikzcd} \varnothing \arrow[r, "f"] \arrow[d, "g"'] & X \arrow[d, "\iota_X"] \\ Y \arrow[r, "\iota_Y"'] & X + Y \end{tikzcd}$
fong-spivak-invitation_DI_0203	203	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-203_204_214_1649_1088.jpg	$\begin{tikzcd} \varnothing \arrow[r, "f"] \arrow[d, "g"'] & X \arrow[d, "x"] \\ Y \arrow[r, "y"'] & T \end{tikzcd}$	$\begin{tikzcd} \varnothing \arrow[r, "f"] \arrow[d, "g"'] & X \arrow[d, "x"] \\ Y \arrow[r, "y"'] & T \end{tikzcd}$	$\begin{tikzcd} \varnothing \arrow[r, "f"] \arrow[d, "g"'] & X \arrow[d, "x"] \\ Y \arrow[r, "y"'] & T \end{tikzcd}$
fong-spivak-invitation_DI_0204	204	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-204_188_756_538_564.jpg	$\begin{tikzcd} X & 0 \arrow[l, dashed] & 1 \arrow[l, dashed] & 2 \arrow[l, dashed] & 3 \arrow[l, dashed] & 4 \arrow[l, dashed] & 5 \arrow[l, dashed] & \cdots \arrow[l, dashed] \\ A \arrow[u, "f"] \arrow[d, "g"'] & 0 \arrow[u, dashed] \arrow[d, dashed] & 1 \arrow[u, dashed] \arrow[d, dashed] & 2 \arrow[u, dashed] \arrow[d, dashed] & 3 \arrow[u, dashed] \arrow[d, dashed] & 4 \arrow[u, dashed] \arrow[d, dashed] & 5 \arrow[u, dashed] \arrow[d, dashed] & \cdots \arrow[u, dashed] \arrow[d, dashed] \\ Y & 0 \arrow[l, dashed] & 1 \arrow[l, dashed] & 2 \arrow[l, dashed] & 3 \arrow[l, dashed] & 4 \arrow[l, dashed] & 5 \arrow[l, dashed] & \cdots \arrow[l, dashed] \end{tikzcd}$	$\begin{tikzcd} X & 0 \arrow[l, dashed] & 1 \arrow[l, dashed] & 2 \arrow[l, dashed] & 3 \arrow[l, dashed] & 4 \arrow[l, dashed] & 5 \arrow[l, dashed] & \cdots \arrow[l, dashed] \\ A \arrow[u, "f"] \arrow[d, "g"'] & 0 \arrow[u, dashed] \arrow[d, dashed] & 1 \arrow[u, dashed] \arrow[d, dashed] & 2 \arrow[u, dashed] \arrow[d, dashed] & 3 \arrow[u, dashed] \arrow[d, dashed] & 4 \arrow[u, dashed] \arrow[d, dashed] & 5 \arrow[u, dashed] \arrow[d, dashed] & \cdots \arrow[u, dashed] \arrow[d, dashed] \\ Y & 0 \arrow[l, dashed] & 1 \arrow[l, dashed] & 2 \arrow[l, dashed] & 3 \arrow[l, dashed] & 4 \arrow[l, dashed] & 5 \arrow[l, dashed] & \cdots \arrow[l, dashed] \end{tikzcd}$	$\begin{tikzcd} X & 0 \arrow[l, dashed] & 1 \arrow[l, dashed] & 2 \arrow[l, dashed] & 3 \arrow[l, dashed] & 4 \arrow[l, dashed] & 5 \arrow[l, dashed] & \cdots \arrow[l, dashed] \\ A \arrow[u, "f"] \arrow[d, "g"'] & 0 \arrow[u, dashed] \arrow[d, dashed] & 1 \arrow[u, dashed] \arrow[d, dashed] & 2 \arrow[u, dashed] \arrow[d, dashed] & 3 \arrow[u, dashed] \arrow[d, dashed] & 4 \arrow[u, dashed] \arrow[d, dashed] & 5 \arrow[u, dashed] \arrow[d, dashed] & \cdots \arrow[u, dashed] \arrow[d, dashed] \\ Y & 0 \arrow[l, dashed] & 1 \arrow[l, dashed] & 2 \arrow[l, dashed] & 3 \arrow[l, dashed] & 4 \arrow[l, dashed] & 5 \arrow[l, dashed] & \cdots \arrow[l, dashed] \end{tikzcd}$
fong-spivak-invitation_DI_0204	204	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-204_208_406_1907_436.jpg	$\begin{tikzcd} D_1 \arrow[dr] & & D_3 \arrow[dl] \arrow[dr, bend left] \arrow[dr, bend right] & & \\ & D_2 & & D_4 \arrow[r] & D_5 \end{tikzcd}$	$\begin{tikzcd} D_1 \arrow[dr] & & D_3 \arrow[dl] \arrow[dr, bend left] \arrow[dr, bend right] & & \\ & D_2 & & D_4 \arrow[r] & D_5 \end{tikzcd}$	$\begin{tikzcd} D_1 \arrow[dr] & & D_3 \arrow[dl] \arrow[dr, bend left] \arrow[dr, bend right] & & \\ & D_2 & & D_4 \arrow[r] & D_5 \end{tikzcd}$
fong-spivak-invitation_DI_0204	204	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-204_208_408_1905_1038.jpg	$\begin{tikzcd} D_1 \arrow[dr] \arrow[ddr, bend right] & & D_3 \arrow[dl] \arrow[dr, bend left] \arrow[dr, bend right] \arrow[dd] & & \\ & D_2 \arrow[dd] & & D_4 \arrow[r] \arrow[dd] & D_5 \arrow[ddl, bend left] \\ & & T & & \end{tikzcd}$	$\begin{tikzcd} D_1 \arrow[dr] \arrow[ddr, bend right] & & D_3 \arrow[dl] \arrow[dr, bend left] \arrow[dr, bend right] \arrow[dd] & & \\ & D_2 \arrow[dd] & & D_4 \arrow[r] \arrow[dd] & D_5 \arrow[ddl, bend left] \\ & & T & & \end{tikzcd}$	$\begin{tikzcd} D_1 \arrow[dr] \arrow[ddr, bend right] & & D_3 \arrow[dl] \arrow[dr, bend left] \arrow[dr, bend right] \arrow[dd] & & \\ & D_2 \arrow[dd] & & D_4 \arrow[r] \arrow[dd] & D_5 \arrow[ddl, bend left] \\ & & T & & \end{tikzcd}$
fong-spivak-invitation_DI_0205	205	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-205_196_234_1705_822.jpg	$\begin{tikzcd} & B \arrow[r] \arrow[d] & Z \\ A \arrow[r] \arrow[d] & C & \\ D & & \end{tikzcd}$	$\begin{tikzcd} & B \arrow[r] \arrow[d] & Z \\ A \arrow[r] \arrow[d] & C & \\ D & & \end{tikzcd}$	$\begin{tikzcd} & B \arrow[r] \arrow[d] & Z \\ A \arrow[r] \arrow[d] & C & \\ D & & \end{tikzcd}$
fong-spivak-invitation_DI_0205	205	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-205_200_238_2065_582.jpg	$\begin{tikzcd} & B \arrow[r] \arrow[d] & Z \arrow[d] \\ A \arrow[r] \arrow[d] & Y \arrow[r] \arrow[d] \arrow[dr, phantom, "\ulcorner", very near start] & R \\ X \arrow[r] & Q \arrow[ur, phantom, "\ulcorner", very near start] & \end{tikzcd}$	$\begin{tikzcd} & B \arrow[r] \arrow[d] & Z \arrow[d] \\ A \arrow[r] \arrow[d] & Y \arrow[r] \arrow[d] \arrow[dr, phantom, "\ulcorner", very near start] & R \\ X \arrow[r] & Q \arrow[ur, phantom, "\ulcorner", very near start] & \end{tikzcd}$	$\begin{tikzcd} & B \arrow[r] \arrow[d] & Z \arrow[d] \\ A \arrow[r] \arrow[d] & Y \arrow[r] \arrow[d] \arrow[dr, phantom, "\ulcorner", very near start] & R \\ X \arrow[r] & Q \arrow[ur, phantom, "\ulcorner", very near start] & \end{tikzcd}$

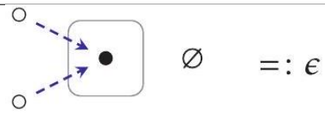
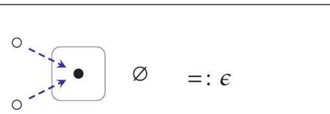
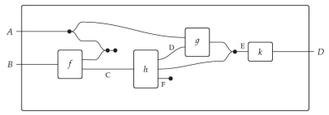
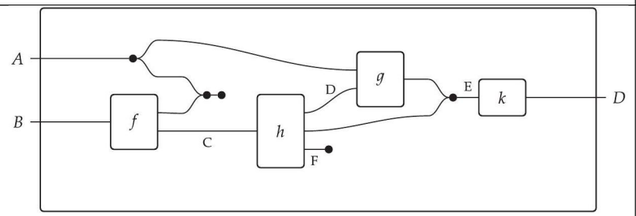
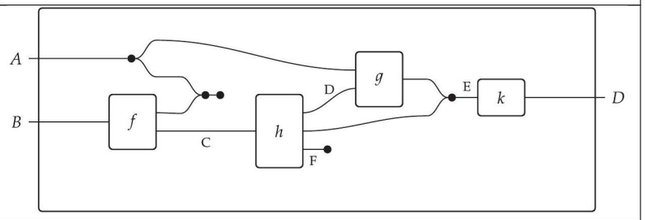
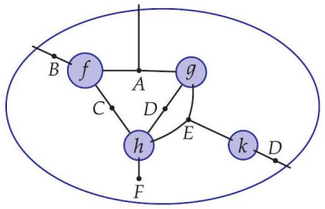
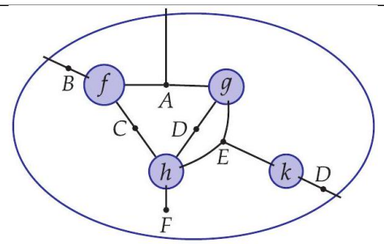
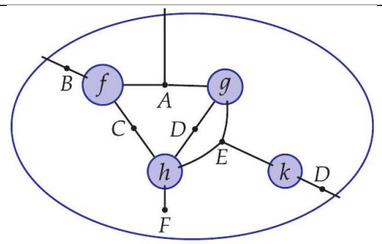
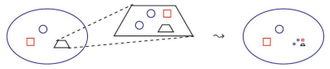
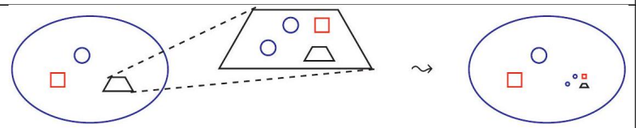
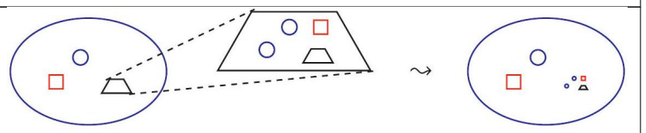
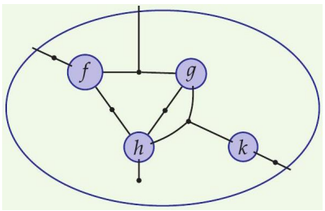
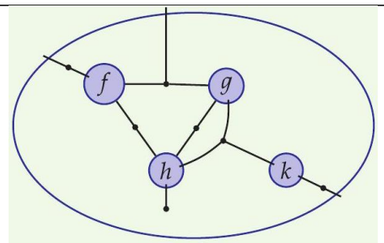
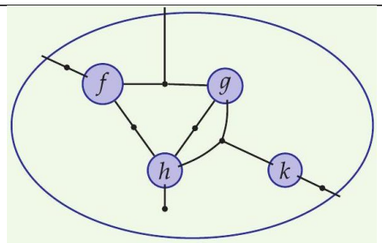
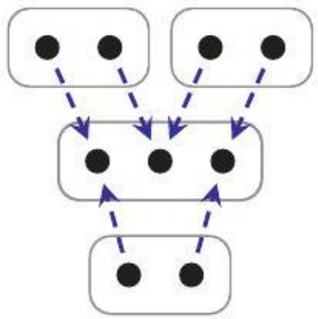
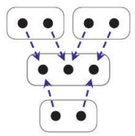
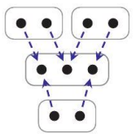
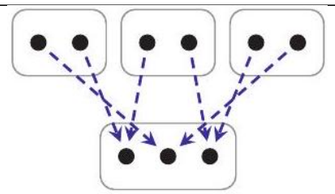
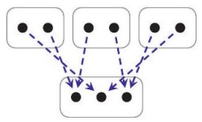
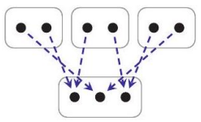
fong-spivak-invitation_DI_205	205	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-205_198_236_2067_1060.jpg			
fong-spivak-invitation_DI_207	207	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-207_156_816_1329_532.jpg			
fong-spivak-invitation_DI_208	208	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-208_134_864_598_508.jpg			
fong-spivak-invitation_DI_208	208	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-208_132_652_890_616.jpg			
fong-spivak-invitation_DI_208	208	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-208_216_1186_1180_346.jpg			
fong-spivak-invitation_DI_208	208	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-208_106_176_2013_644.jpg			
fong-spivak-invitation_DI_208	208	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-208_106_176_2013_1060.jpg			
fong-spivak-invitation_DI_209	209	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-209_224_224_1437_576.jpg			

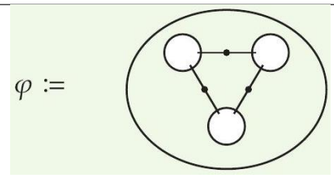
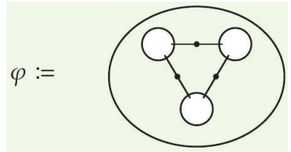
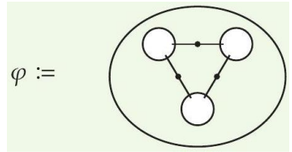
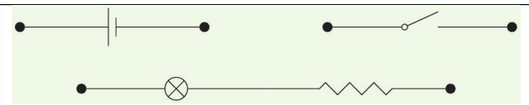
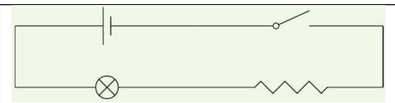
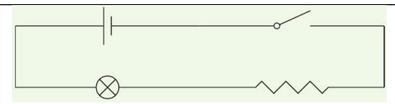
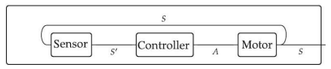
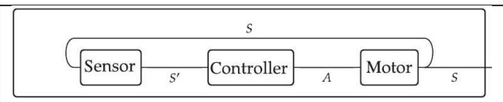
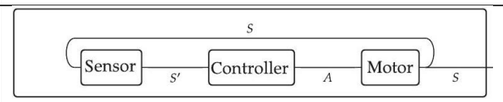
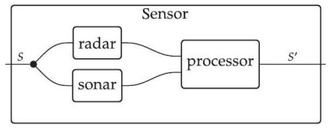
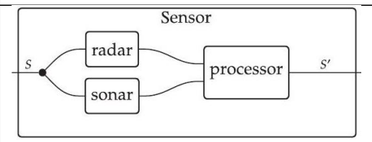
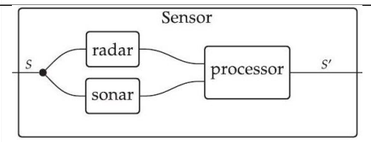
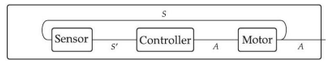
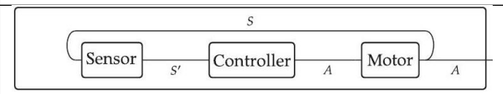
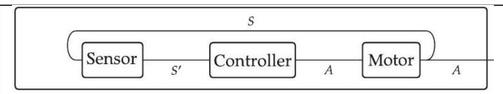
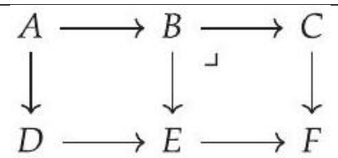
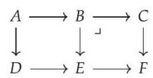
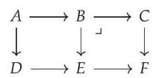
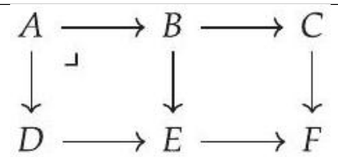
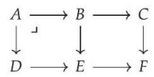
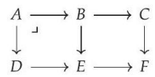
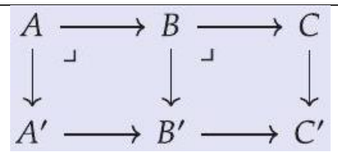
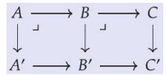
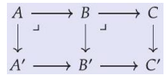
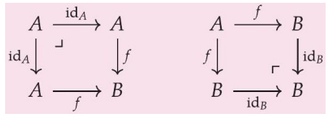
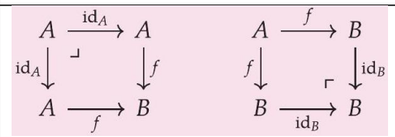
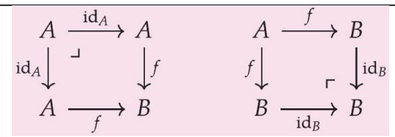
fong-spivak-invitation_DI_209	209	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-209_198_322_1455_980.jpg			
fong-spivak-invitation_DI_210	210	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-210_224_732_310_576.jpg			
fong-spivak-invitation_DI_210	210	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-210_260_998_1076_408.jpg			
fong-spivak-invitation_DI_211	211	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-211_44_80_686_779.jpg			
fong-spivak-invitation_DI_211	211	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-211_19_51_699_1081.jpg			
fong-spivak-invitation_DI_211	211	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-211_70_272_895_452.jpg			
fong-spivak-invitation_DI_211	211	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-211_53_266_902_806.jpg			
fong-spivak-invitation_DI_211	211	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-211_51_238_904_1157.jpg			
fong-spivak-invitation_DI_211	211	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-211_70_352_1999_635.jpg			
fong-spivak-invitation_DI_211	211	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-211_40_222_2014_1054.jpg			
fong-spivak-invitation_DI_212	212	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-212_164_936_620_472.jpg			
fong-spivak-invitation_DI_212	212	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-212_92_416_968_732.jpg			
fong-spivak-invitation_DI_212	212	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-212_120_430_1921_726.jpg			

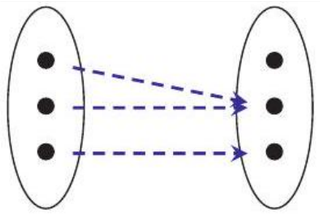
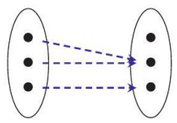
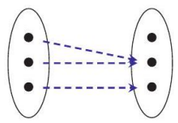
fong-spivak-invitation_DI_1281	213	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-213_72_114_324_904.jpg			
fong-spivak-invitation_DI_1282	213	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-213_72_184_480_868.jpg			
fong-spivak-invitation_DI_1283	213	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-213_116_232_634_844.jpg			
fong-spivak-invitation_DI_1284	213	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-213_70_232_836_844.jpg			
fong-spivak-invitation_DI_1285	213	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-213_132_232_986_844.jpg			
fong-spivak-invitation_DI_1286	213	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-213_160_320_1245_800.jpg			
fong-spivak-invitation_DI_1287	214	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-214_304_894_1096_494.jpg			
fong-spivak-invitation_DI_1288	215	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-215_324_924_420_478.jpg			
fong-spivak-invitation_DI_1289	216	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-216_84_272_954_488.jpg			

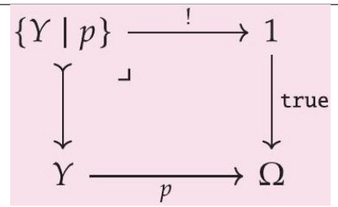
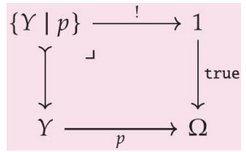
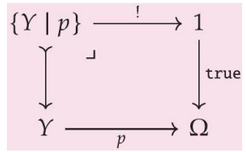
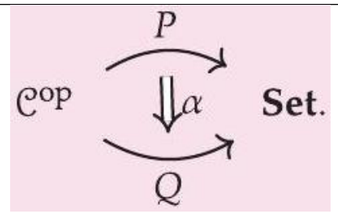
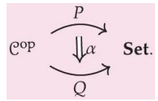
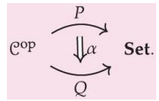
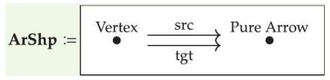
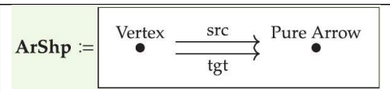
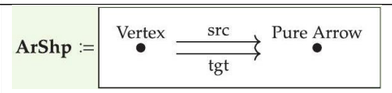
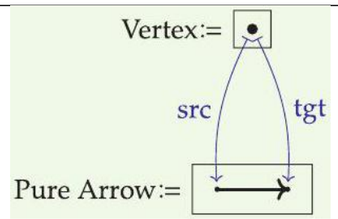
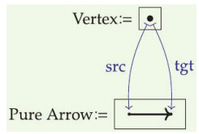
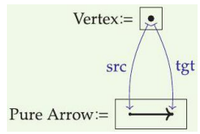
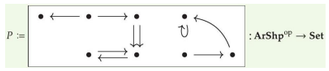
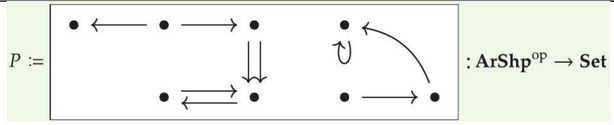
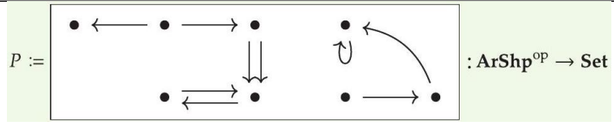
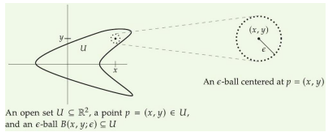
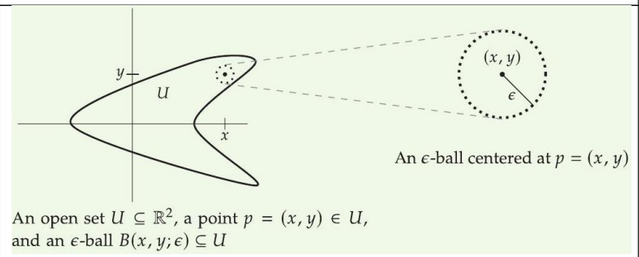
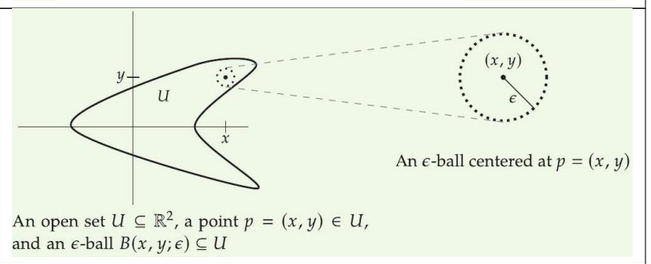
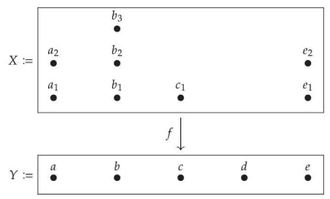
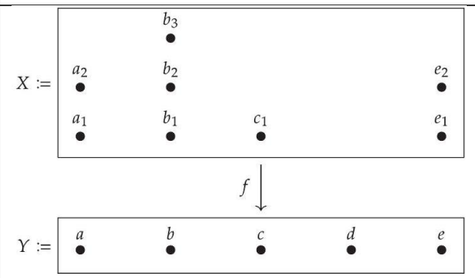
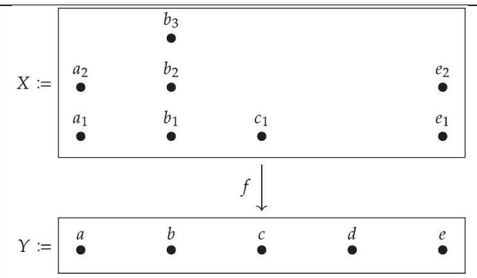
fong-spivak-invitation_DI_1269	216	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-216_84_270_954_1122.jpg			
fong-spivak-invitation_DI_1270	216	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-216_352_866_1200_510.jpg			
fong-spivak-invitation_DI_1272	217	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-217_210_582_1673_648.jpg	$\mathsf{P}(S)\times\mathsf{P}(T) \xrightarrow{\varphi_{S,T}} \mathsf{P}(S\times T)$ $\mathrm{im}_f\times\mathrm{im}_g \downarrow \quad \downarrow \mathrm{im}_{f\times g}$ $\mathsf{P}(S')\times\mathsf{P}(T') \xrightarrow[\varphi_{S',T'}]{} \mathsf{P}(S'\times T')$	$\mathsf{P}(S)\times\mathsf{P}(T) \xrightarrow{\varphi_{S,T}} \mathsf{P}(S\times T)$ $\mathrm{im}_f\times\mathrm{im}_g \downarrow \quad \downarrow \mathrm{im}_{f\times g}$ $\mathsf{P}(S')\times\mathsf{P}(T') \xrightarrow[\varphi_{S',T'}]{} \mathsf{P}(S'\times T')$	$\mathsf{P}(S)\times\mathsf{P}(T) \xrightarrow{\varphi_{S,T}} \mathsf{P}(S\times T)$ $\mathrm{im}_f\times\mathrm{im}_g \downarrow \quad \downarrow \mathrm{im}_{f\times g}$ $\mathsf{P}(S')\times\mathsf{P}(T') \xrightarrow[\varphi_{S',T'}]{} \mathsf{P}(S'\times T')$
fong-spivak-invitation_DI_1273	218	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-218_234_320_366_780.jpg			
fong-spivak-invitation_DI_1274	218	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-218_286_618_962_632.jpg			
fong-spivak-invitation_DI_1275	218	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-218_194_626_1625_628.jpg			
fong-spivak-invitation_DI_1276	218	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-218_226_878_2021_502.jpg			
fong-spivak-invitation_DI_1277	219	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-219_336_1138_396_370.jpg			
fong-spivak-invitation_DI_1278	220	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-220_110_224_1927_828.jpg			

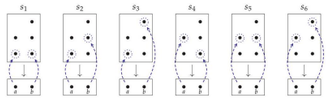
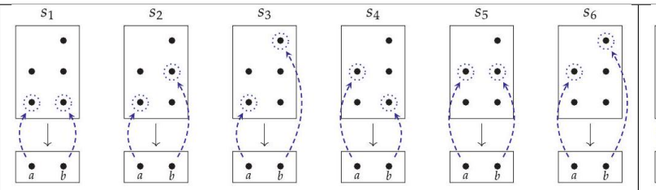
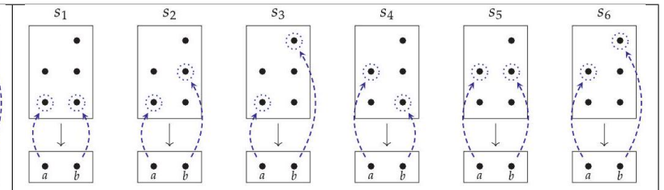
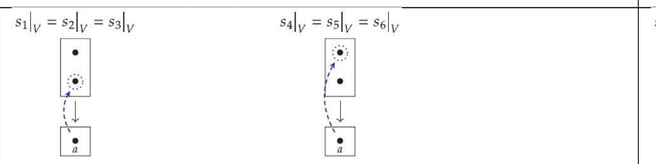
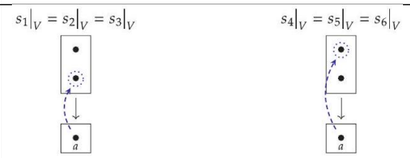
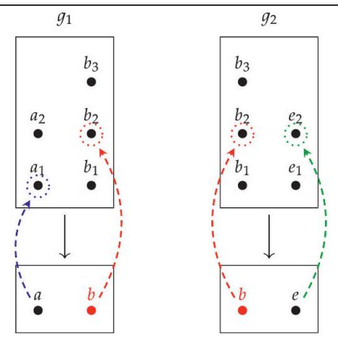
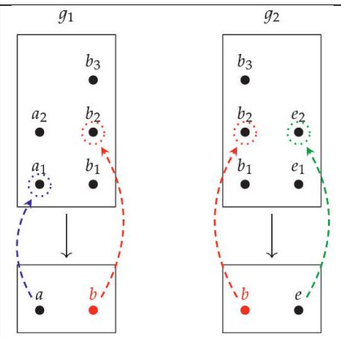
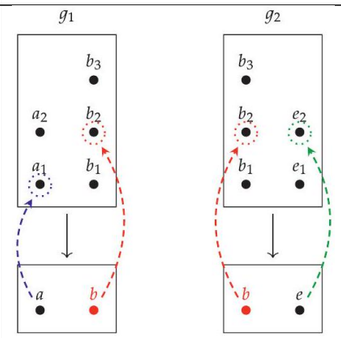
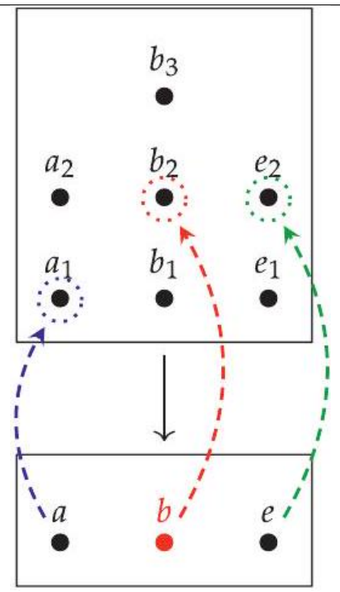
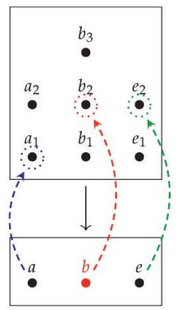
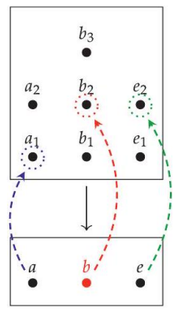
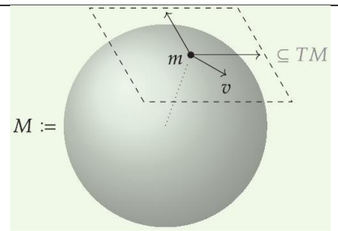
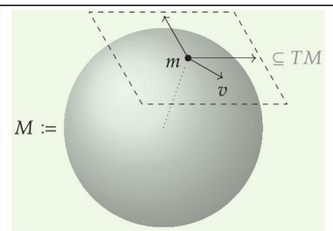
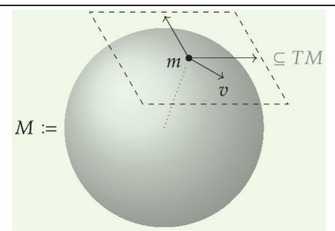
fong-spivak-invitation_DI_2019	221	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-221_108_520_1068_678.jpg			
fong-spivak-invitation_DI_2019	221	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-221_192_520_1269_678.jpg			
fong-spivak-invitation_DI_2019	221	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-221_70_810_2049_534.jpg			
fong-spivak-invitation_DI_2019	222	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-222_26_86_672_898.jpg			
fong-spivak-invitation_DI_2019	222	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-222_94_420_1068_728.jpg			
fong-spivak-invitation_DI_2019	222	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-222_94_420_1703_728.jpg			
fong-spivak-invitation_DI_2019	222	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-222_96_420_2147_396.jpg			
fong-spivak-invitation_DI_2019	222	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-222_96_420_2149_1064.jpg			
fong-spivak-invitation_DI_2019	223	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-223_260_814_394_530.jpg			
fong-spivak-invitation_DI_2019	223	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-223_94_420_764_728.jpg			
fong-spivak-invitation_DI_2019	223	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-223_70_616_1068_632.jpg			
fong-spivak-invitation_DI_2019	223	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-223_68_420_1393_728.jpg			
fong-spivak-invitation_DI_2019	223	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-223_94_618_1579_630.jpg			
fong-spivak-invitation_DI_2019	224	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-224_96_616_382_632.jpg			
fong-spivak-invitation_DI_2019	224	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-224_96_616_552_632.jpg			
fong-spivak-invitation_DI_2019	224	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-224_194_618_746_632.jpg			
fong-spivak-invitation_DI_2019	224	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-224_128_360_1204_460.jpg			

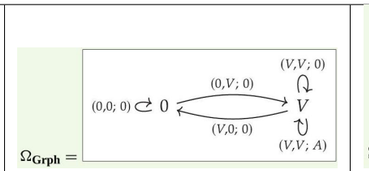
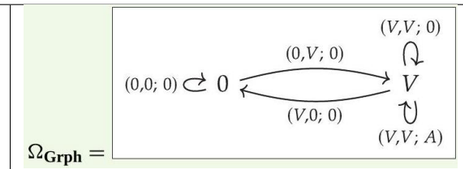
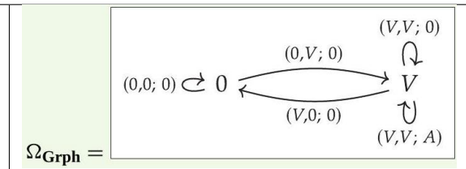
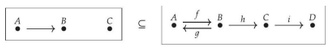
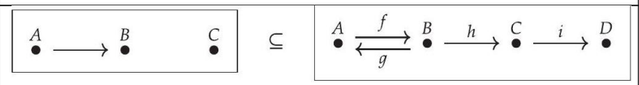
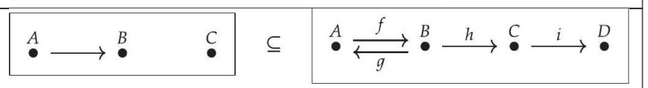
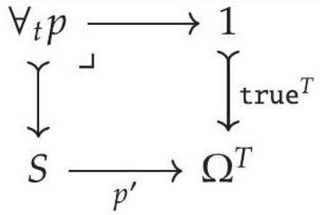
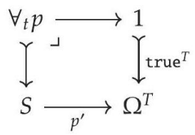
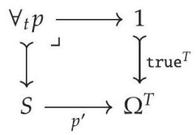
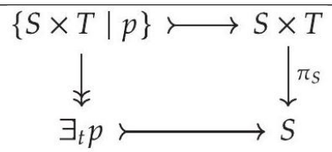
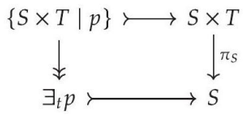
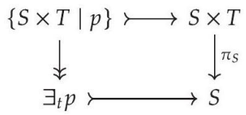
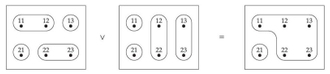
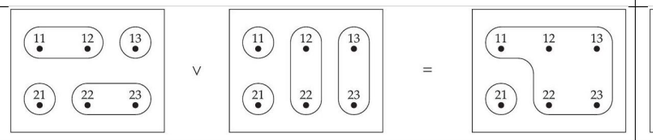
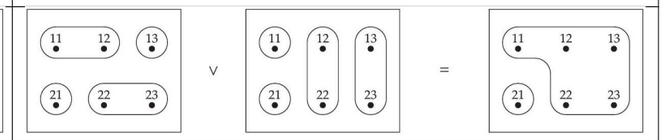
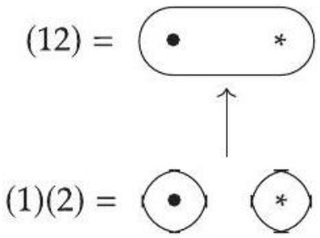
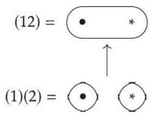
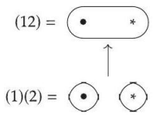
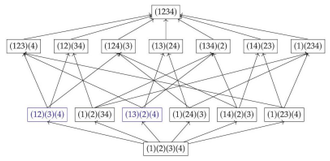
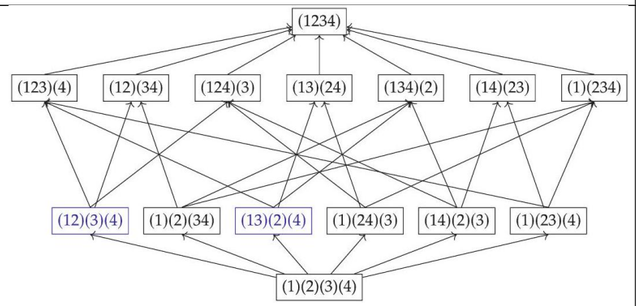
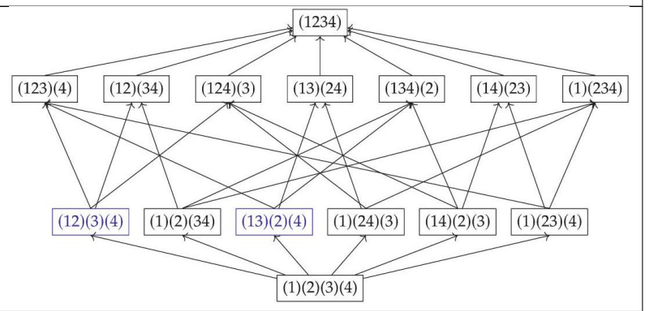
fong-spivak-invitation_DI_2018	224	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-224_122_364_1207_1056.jpg			
fong-spivak-invitation_DI_2018	225	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-225_410_1223_1519_330.jpg			
fong-spivak-invitation_DI_2018	226	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-226_382_592_258_644.jpg			
fong-spivak-invitation_DI_2018	227	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-227_222_1130_884_374.jpg			
fong-spivak-invitation_DI_2018	228	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-228_380_592_1893_644.jpg			
fong-spivak-invitation_DI_2018	229	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-229_208_208_1024_856.jpg			
fong-spivak-invitation_DI_2018	229	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-229_184_312_1477_804.jpg			

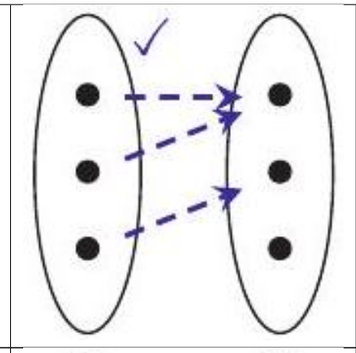
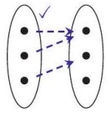
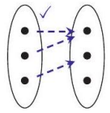
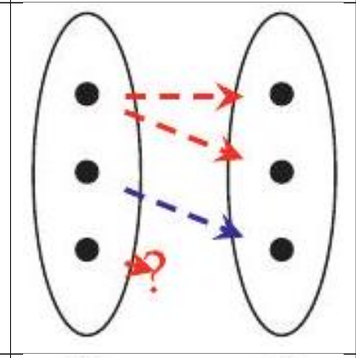
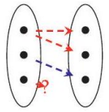
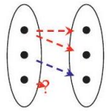
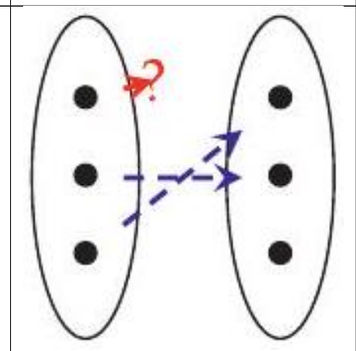
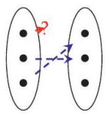
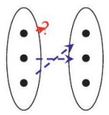
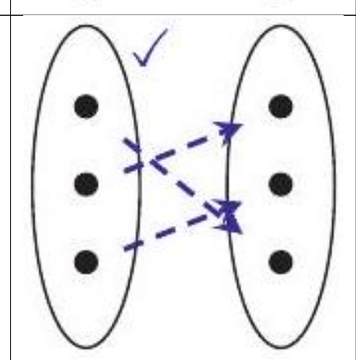
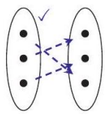
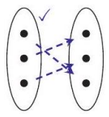
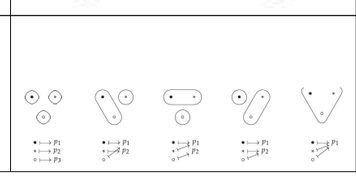
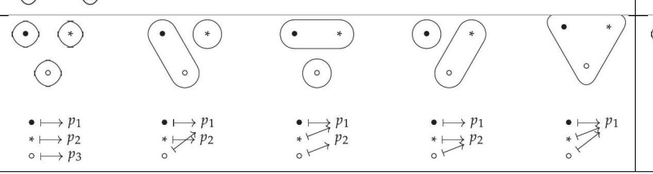
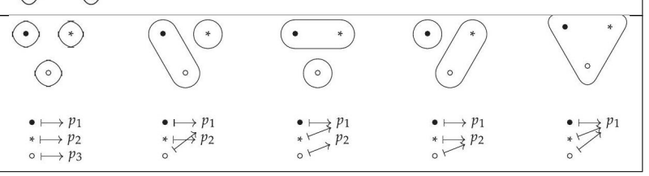
fong-spivak-invitation_DI_2613	231	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-231_240_452_298_712.jpg			
fong-spivak-invitation_DI_2614	231	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-231_158_814_864_532.jpg			
fong-spivak-invitation_DI_2615	231	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-231_156_600_1116_638.jpg			
fong-spivak-invitation_DI_2616	233	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-233_148_770_1661_552.jpg			
fong-spivak-invitation_DI_2617	234	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-234_214_560_710_660.jpg			
fong-spivak-invitation_DI_2618	235	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-235_138_772_1475_550.jpg			
fong-spivak-invitation_DI_2619	237	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-237_112_232_652_612.jpg			
fong-spivak-invitation_DI_2620	237	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-237_112_232_652_1034.jpg			
fong-spivak-invitation_DI_2621	237	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-237_114_250_1128_814.jpg			
fong-spivak-invitation_DI_2622	237	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-237_208_604_1945_636.jpg			

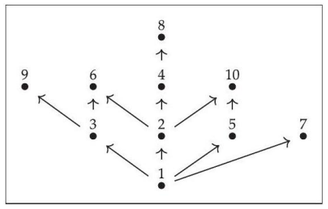
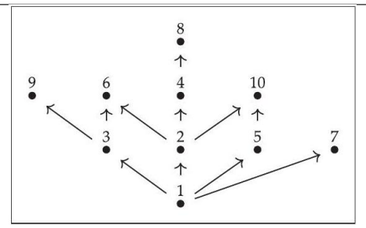
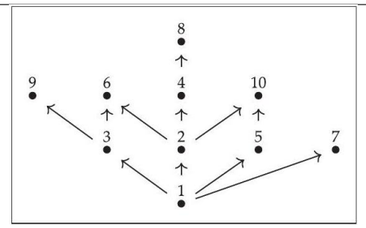
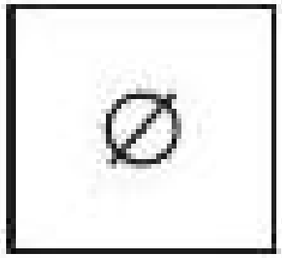
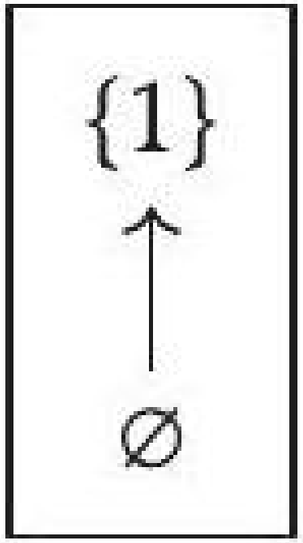
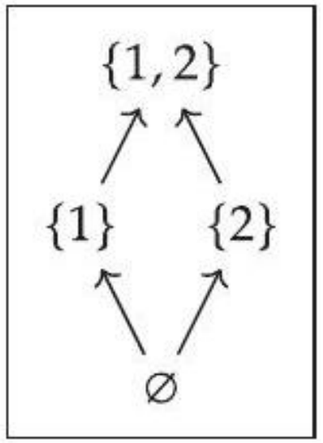
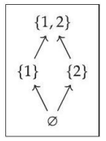
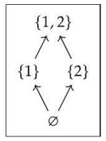
fong-spivak-invitation_DI_238	238	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-238_212_220_744_852.jpg	$\begin{tikzcd} A' \arrow[r, "f'"] \arrow[d, "i'"', "\cong"] \arrow[dr, phantom, "\lrcorner", very near start] & B' \arrow[d, "i", "\cong"'] \\ A \arrow[r, "f"'] & B \end{tikzcd}$	$\begin{tikzcd} A' \arrow[r, "f'"] \arrow[d, "i'"', "\cong"] \arrow[dr, phantom, "\lrcorner", very near start] & B' \arrow[d, "i", "\cong"'] \\ A \arrow[r, "f"'] & B \end{tikzcd}$	$\begin{tikzcd} A' \arrow[r, "f'"] \arrow[d, "i'"', "\cong"] \arrow[dr, phantom, "\lrcorner", very near start] & B' \arrow[d, "i", "\cong"'] \\ A \arrow[r, "f"'] & B \end{tikzcd}$
fong-spivak-invitation_DI_238	238	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-238_208_188_1084_868.jpg	$\begin{tikzcd} A \arrow[r, "f"] \arrow[d, equal] \arrow[dr, phantom, "\lrcorner", very near start] & B \arrow[d, equal] \\ A \arrow[r, "f"'] & B \end{tikzcd}$	$\begin{tikzcd} A \arrow[r, "f"] \arrow[d, equal] \arrow[dr, phantom, "\lrcorner", very near start] & B \arrow[d, equal] \\ A \arrow[r, "f"'] & B \end{tikzcd}$	$\begin{tikzcd} A \arrow[r, "f"] \arrow[d, equal] \arrow[dr, phantom, "\lrcorner", very near start] & B \arrow[d, equal] \\ A \arrow[r, "f"'] & B \end{tikzcd}$
fong-spivak-invitation_DI_238	238	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-238_194_232_1489_824.jpg	$\begin{tikzcd} A' \arrow[r, "g"] \arrow[d, "f'"'] \arrow[dr, phantom, "\lrcorner", very near start] & A \arrow[d, tail, "f"] \\ B' \arrow[r, "h"'] & B \end{tikzcd}$	$\begin{tikzcd} A' \arrow[r, "g"] \arrow[d, "f'"'] \arrow[dr, phantom, "\lrcorner", very near start] & A \arrow[d, tail, "f"] \\ B' \arrow[r, "h"'] & B \end{tikzcd}$	$\begin{tikzcd} A' \arrow[r, "g"] \arrow[d, "f'"'] \arrow[dr, phantom, "\lrcorner", very near start] & A \arrow[d, tail, "f"] \\ B' \arrow[r, "h"'] & B \end{tikzcd}$
fong-spivak-invitation_DI_239	239	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-239_186_276_370_800.jpg			
fong-spivak-invitation_DI_240	240	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-240_232_312_1076_474.jpg	$\begin{tikzcd} X \arrow[r, "!"] \arrow[d, tail, "m"'] \arrow[dr, phantom, "\lrcorner", very near start] & 1 \arrow[d, "\mathtt{true}"] \\ Y \arrow[r, "\ulcorner m \urcorner"'] & \Omega \end{tikzcd}$	$\begin{tikzcd} X \arrow[r, "!"] \arrow[d, tail, "m"'] \arrow[dr, phantom, "\lrcorner", very near start] & 1 \arrow[d, "\mathtt{true}"] \\ Y \arrow[r, "\ulcorner m \urcorner"'] & \Omega \end{tikzcd}$	$\begin{tikzcd} X \arrow[r, "!"] \arrow[d, tail, "m"'] \arrow[dr, phantom, "\lrcorner", very near start] & 1 \arrow[d, "\mathtt{true}"] \\ Y \arrow[r, "\ulcorner m \urcorner"'] & \Omega \end{tikzcd}$

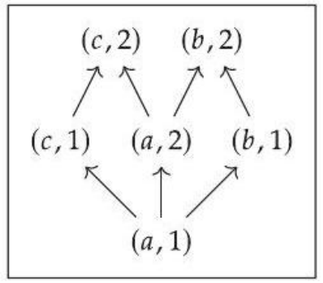
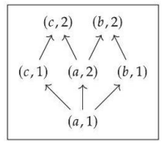
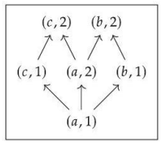
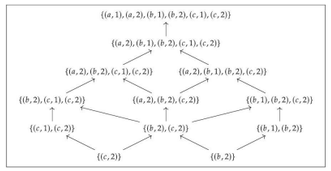
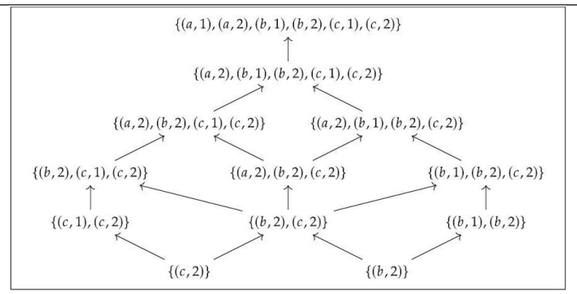
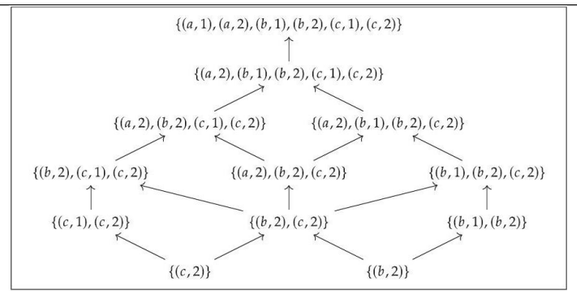
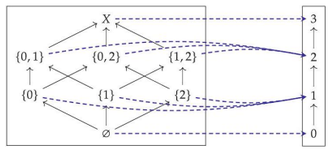
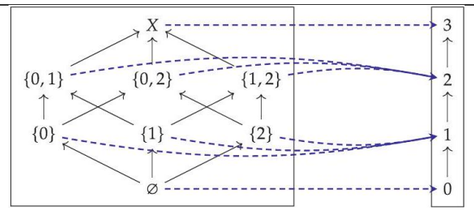
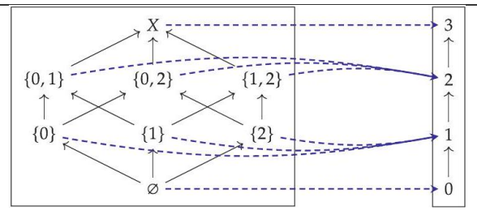
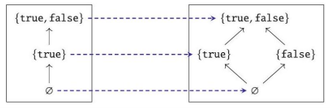
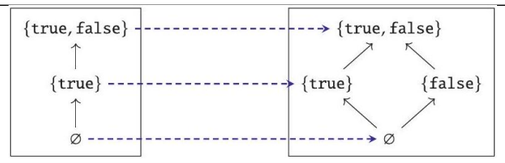
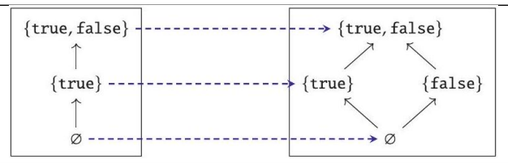
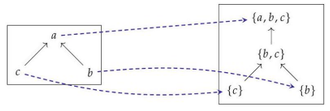
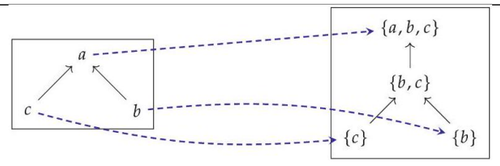
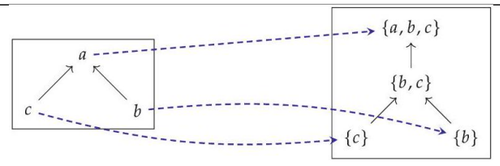
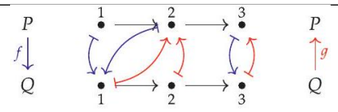
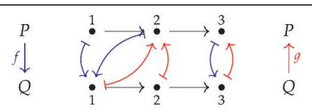
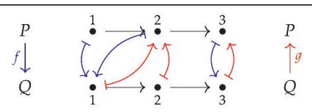
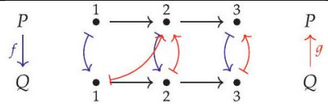
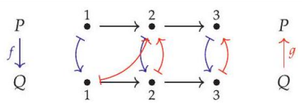
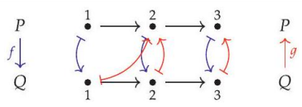
fong-spivak-invitation_DIL_4540	240	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-240_236_376_1070_1028.jpg			
fong-spivak-invitation_DIL_4540	245	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-245_154_238_426_820.jpg			
fong-spivak-invitation_DIL_4540	245	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-245_134_592_806_640.jpg			
fong-spivak-invitation_DIL_4540	245	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-245_202_304_1036_786.jpg			
fong-spivak-invitation_DIL_4540	245	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-245_192_968_1421_456.jpg			
fong-spivak-invitation_DIL_4540	247	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-247_400_998_694_442.jpg			
fong-spivak-invitation_DIL_4540	250	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-250_434_730_1138_592.jpg			

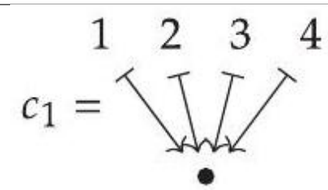
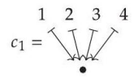
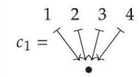
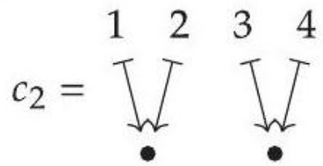
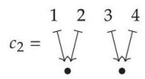
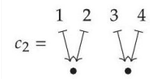
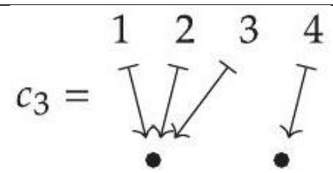
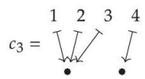
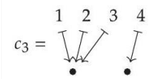
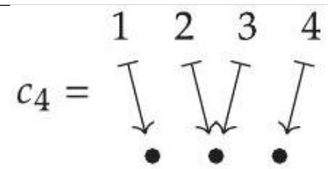
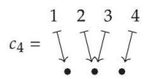
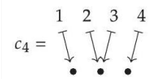
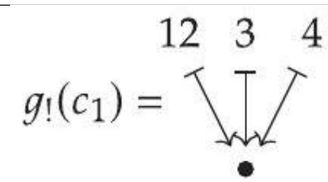
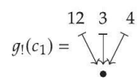
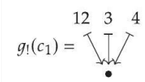
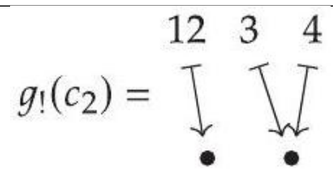
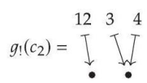
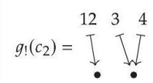
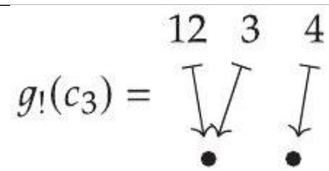
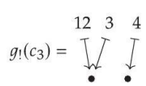
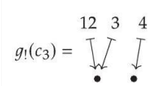
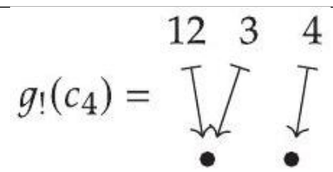
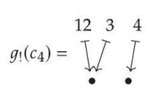
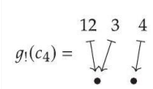
fong-spivak-invitation_DI_3645	251	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-251_296_1016_768_388.jpg			
fong-spivak-invitation_DI_3646	251	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-251_242_626_1787_624.jpg			
fong-spivak-invitation_DI_3647	252	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-252_530_516_564_700.jpg			
fong-spivak-invitation_DI_3648	252	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-252_484_264_1317_808.jpg			
fong-spivak-invitation_DI_3649	253	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-253_354_502_1529_688.jpg			

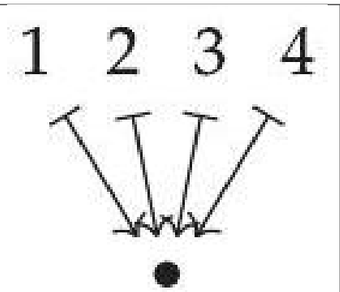
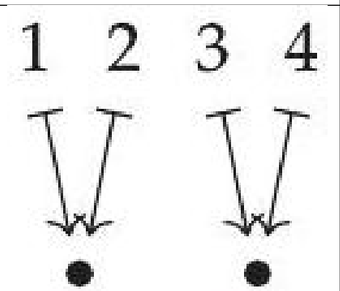
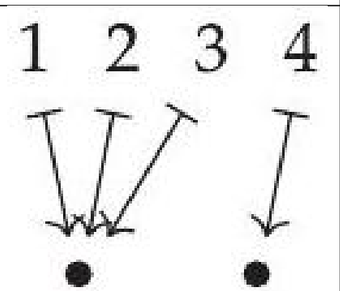
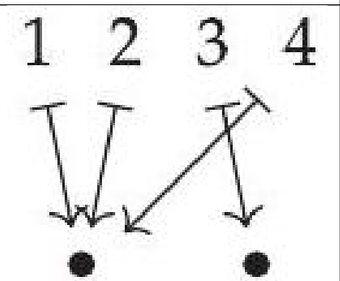
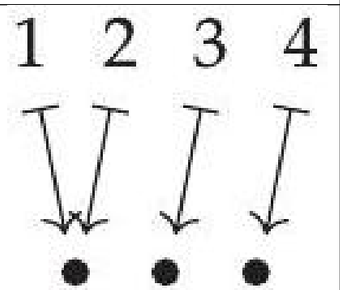
fong-spivak-invitation_DI2_0330	257	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-257_262_696_482_590.jpg			
fong-spivak-invitation_DI2_0331	257	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-257_124_1010_1413_434.jpg			
fong-spivak-invitation_DI2_0332	262	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-262_206_304_378_788.jpg			
fong-spivak-invitation_DI2_0333	262	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-262_176_384_1643_748.jpg			
fong-spivak-invitation_DI2_0334	270	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-270_250_1219_1635_334.jpg			
fong-spivak-invitation_DI2_0335	270	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-270_180_236_2065_844.jpg			
fong-spivak-invitation_DI2_0336	271	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-271_512_1070_332_422.jpg			

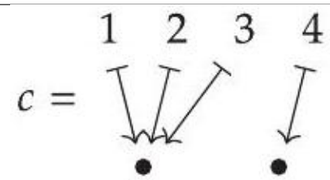
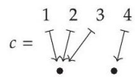
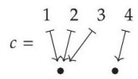
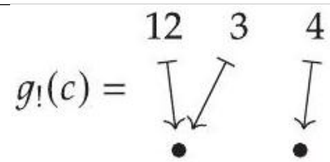
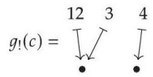
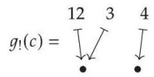
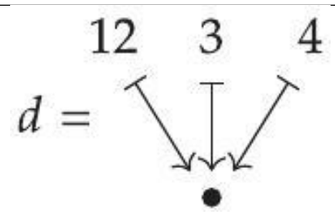
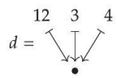
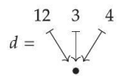
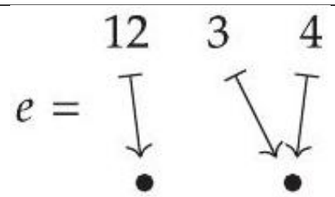
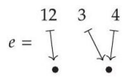
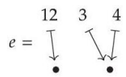
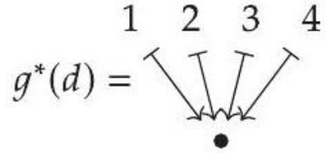
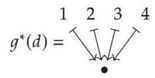
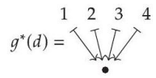
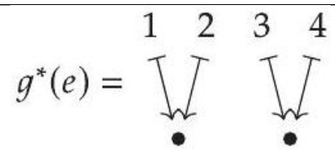
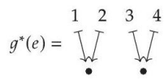
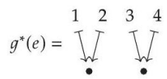
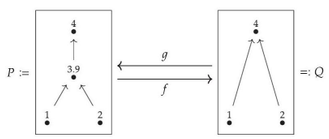
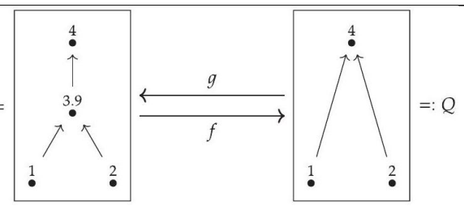
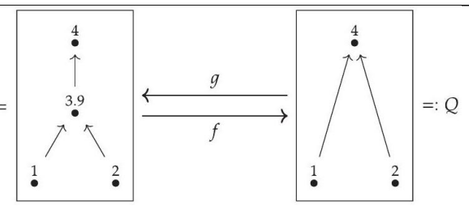
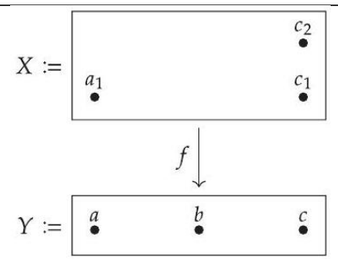
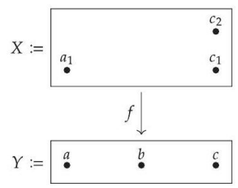
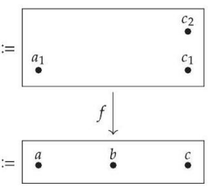
fong-spivak-invitation_DIA_0320	272	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-272_172_164_2071_436.jpg			
fong-spivak-invitation_DIA_0320	272	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-272_174_162_2071_732.jpg			
fong-spivak-invitation_DIA_0320	272	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-272_174_162_2071_1028.jpg			
fong-spivak-invitation_DIA_0320	272	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-272_174_162_2071_1323.jpg			
fong-spivak-invitation_DIA_0320	273	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-273_286_1202_794_338.jpg			

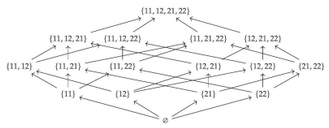
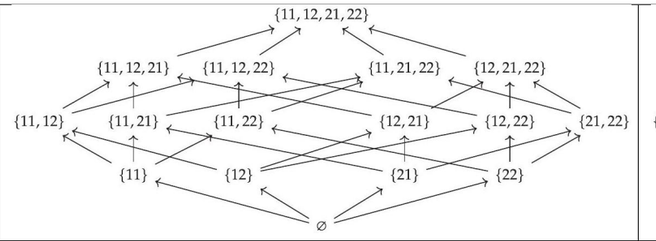
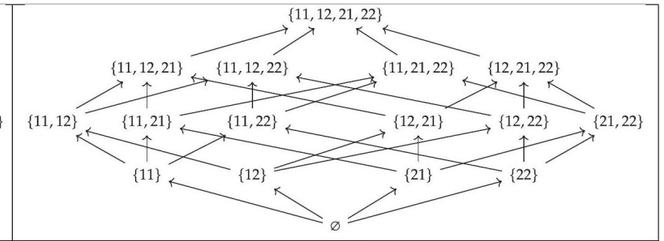
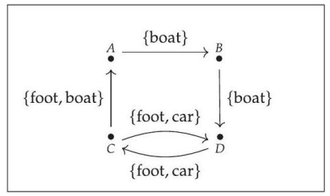
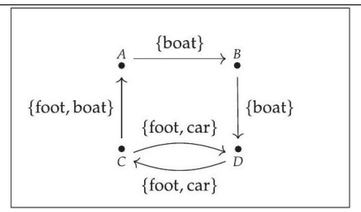
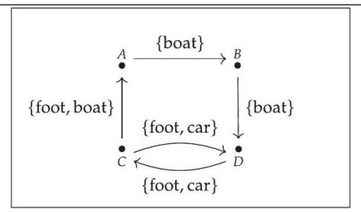
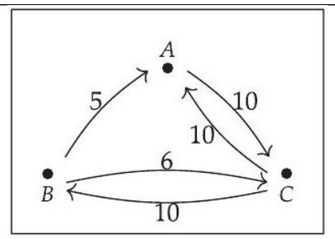
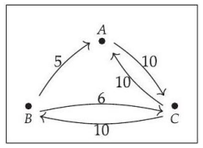
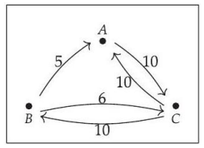
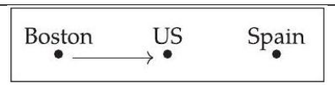
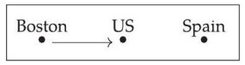
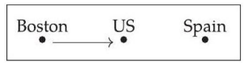
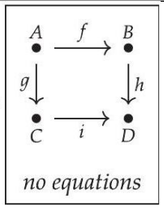
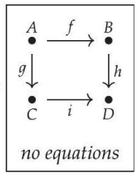
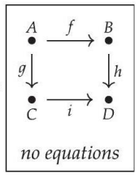
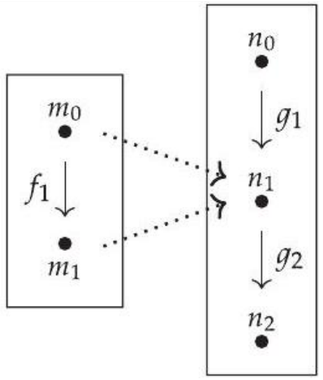
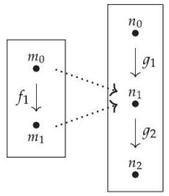
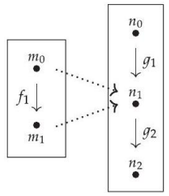
fong-spivak-invitation_DI_0362	274	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-274_354_558_866_660.jpg			
fong-spivak-invitation_DI_0363	274	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-274_58_64_1661_682.jpg			
fong-spivak-invitation_DI_0364	274	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-274_140_80_1621_852.jpg			
fong-spivak-invitation_DI_0365	274	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-274_218_156_1581_1040.jpg			

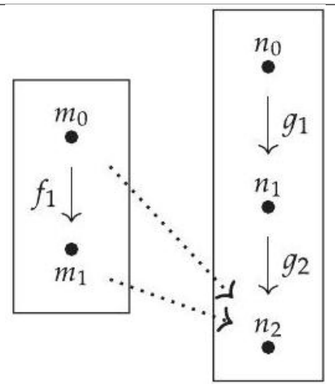
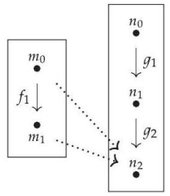
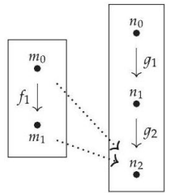
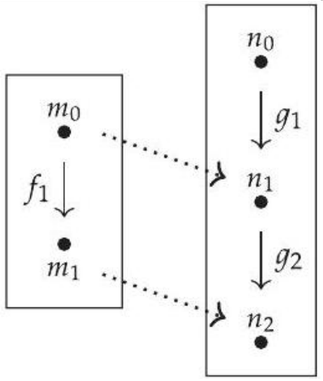
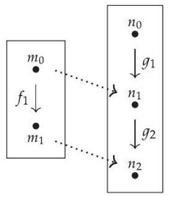
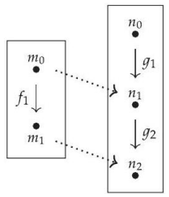
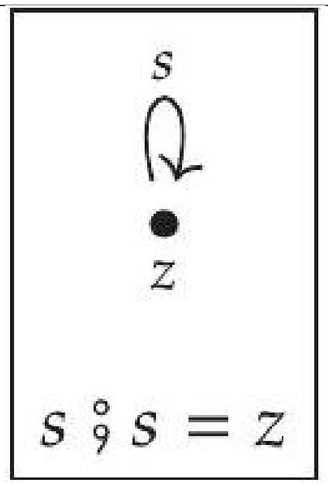
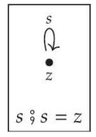
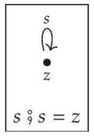
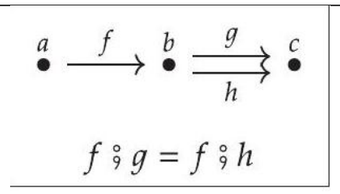
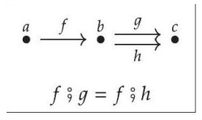
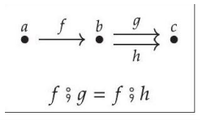
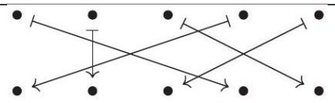
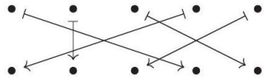
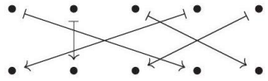
fong-spivak-invitation_DI_275	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-275_360_252_382_336.jpg			
fong-spivak-invitation_DI_275	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-275_458_894_384_642.jpg			
fong-spivak-invitation_DI_275	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-275_324_732_1096_572.jpg			
fong-spivak-invitation_DI_275	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-275_244_784_1573_548.jpg			
fong-spivak-invitation_DI_276	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-276_248_776_370_572.jpg			
fong-spivak-invitation_DI_278	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-278_152_472_616_724.jpg			
fong-spivak-invitation_DI_278	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-278_156_472_1044_724.jpg			

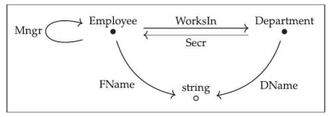
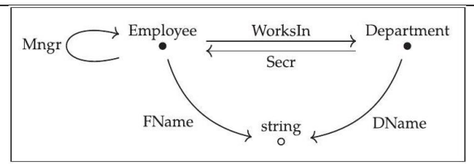
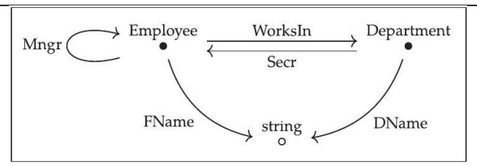
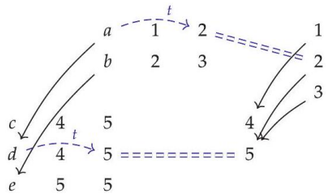
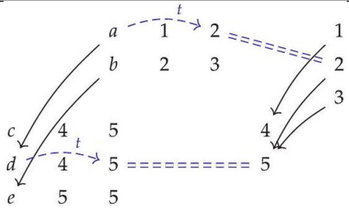
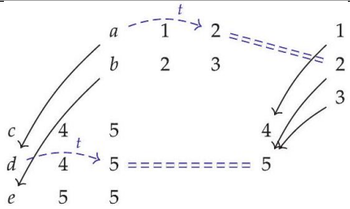
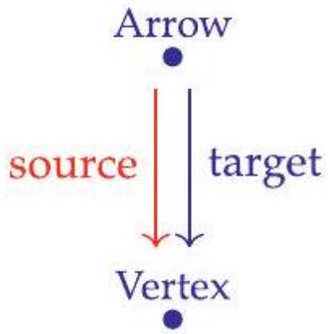
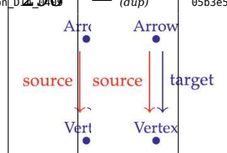
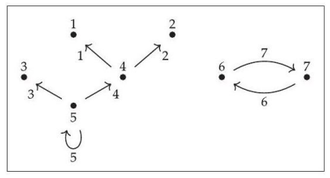
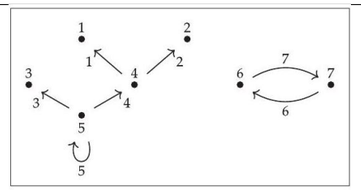
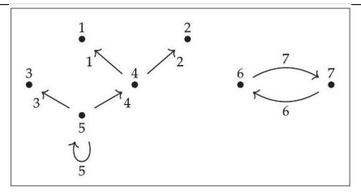
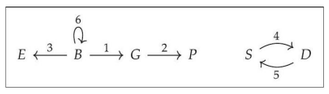
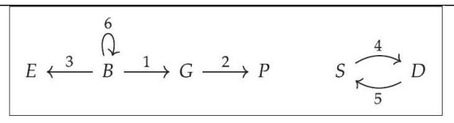
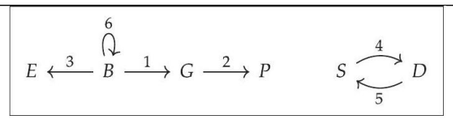
fong-spivak-invitation_DI_2_930	278	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-278_118_200_1877_382.jpg			
fong-spivak-invitation_DI_2_930	278	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-278_120_220_1877_668.jpg			
fong-spivak-invitation_DI_2_930	278	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-278_118_218_1879_974.jpg			
fong-spivak-invitation_DI_2_930	278	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-278_116_220_1881_1279.jpg			
fong-spivak-invitation_DI_2_930	278	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-278_116_210_2111_376.jpg			
fong-spivak-invitation_DI_2_930	278	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-278_116_222_2113_670.jpg			
fong-spivak-invitation_DI_2_930	278	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-278_116_220_2113_976.jpg			
fong-spivak-invitation_DI_2_930	278	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-278_116_222_2113_1281.jpg			

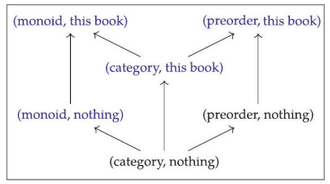
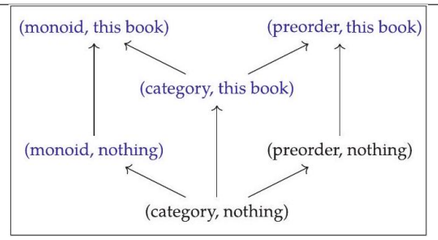
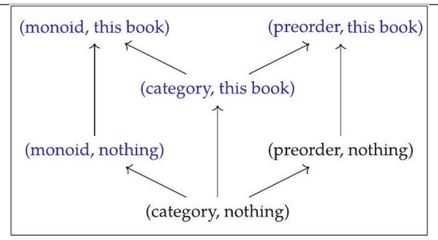
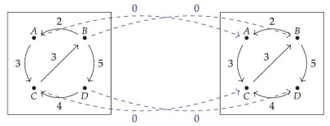
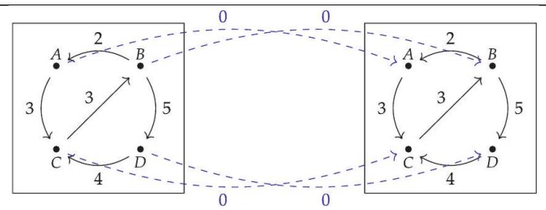
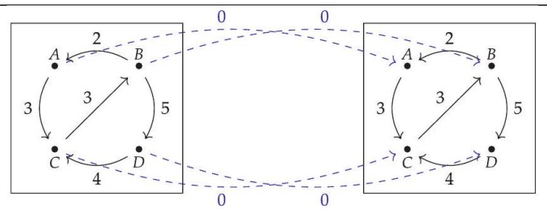
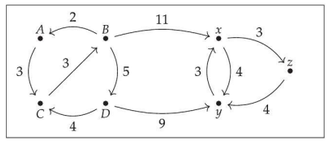
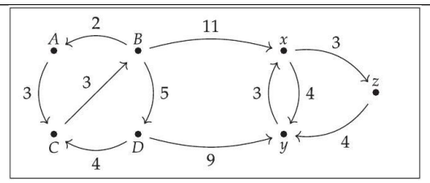
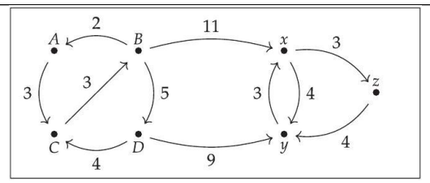
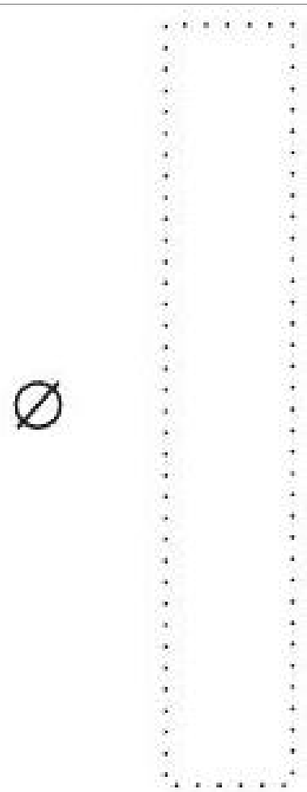
fong-spivak-invitation_DI_0381	279	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-279_118_128_426_456.jpg			
fong-spivak-invitation_DI_0381	279	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-279_116_126_428_666.jpg			
fong-spivak-invitation_DI_0381	279	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-279_116_126_428_876.jpg			
fong-spivak-invitation_DI_0381	279	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-279_116_128_430_1084.jpg			
fong-spivak-invitation_DI_0381	279	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-279_114_124_430_1297.jpg			

fong-spivak-invitation_DI2_0380	279	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-279_114_206_804_644.jpg			
fong-spivak-invitation_DI2_0380	279	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-279_116_230_804_1044.jpg			
fong-spivak-invitation_DI2_0380	279	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-279_112_174_1056_872.jpg			
fong-spivak-invitation_DI2_0380	279	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-279_114_186_1309_866.jpg			
fong-spivak-invitation_DI2_0380	279	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-279_114_232_1539_668.jpg			
fong-spivak-invitation_DI2_0380	279	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-279_116_250_1539_998.jpg			
fong-spivak-invitation_DI2_0380	280	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-280_320_788_1156_548.jpg			
fong-spivak-invitation_DI2_0380	281	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-281_290_366_374_754.jpg			

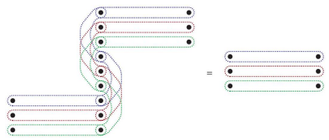
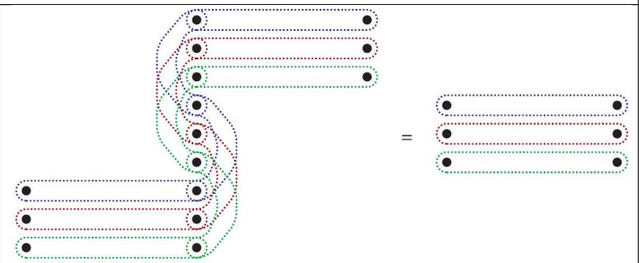
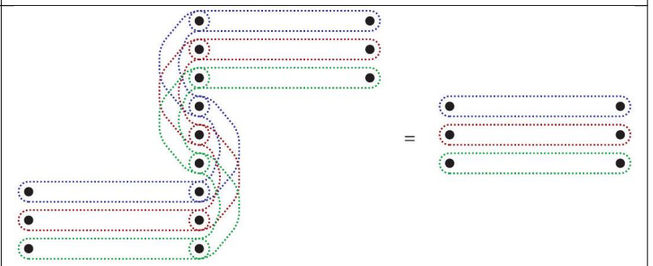
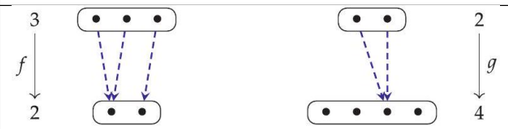
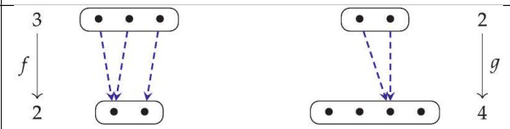
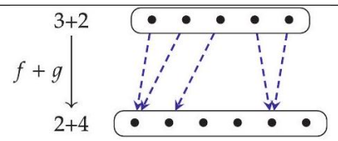
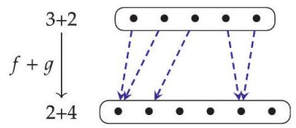
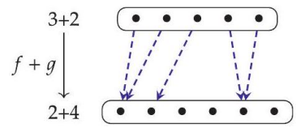
fong-spivak-invitation_DI_0014	281	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-281_416_1132_1509_372.jpg			
fong-spivak-invitation_DI_0015	285	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-285_326_548_1627_684.jpg			
fong-spivak-invitation_DI_0016	286	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-286_228_314_718_804.jpg			
fong-spivak-invitation_DI_0017	286	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-286_94_382_1757_750.jpg			
fong-spivak-invitation_DI_0018	291	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-291_274_428_480_722.jpg	Free_square := 	Free_square := 	Free_square := 
fong-spivak-invitation_DI_0019	292	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-292_306_258_1797_336.jpg			

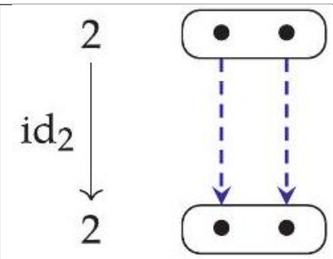
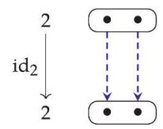
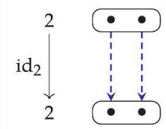
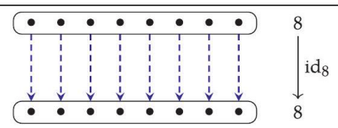
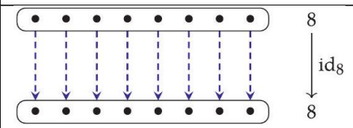
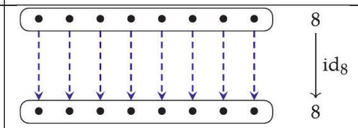
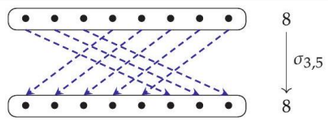
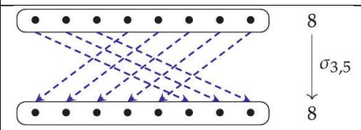
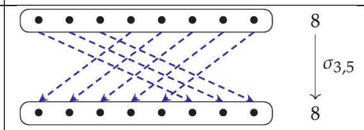
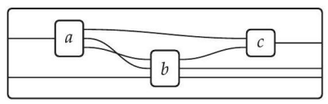
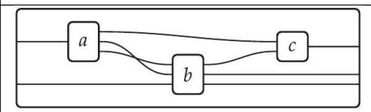
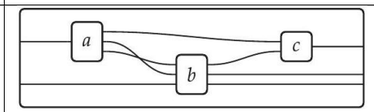
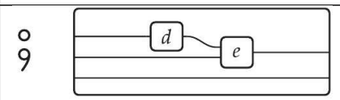
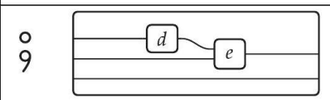
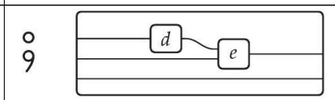
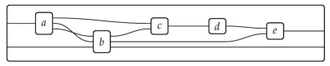
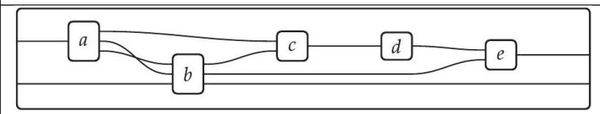
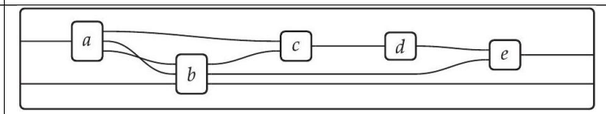
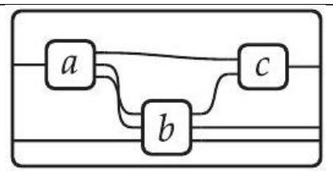
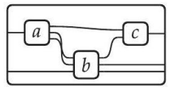
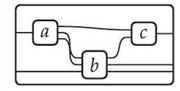
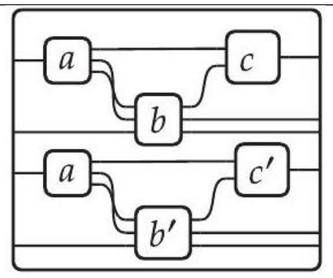
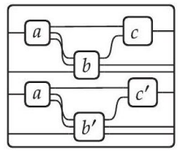
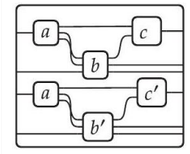
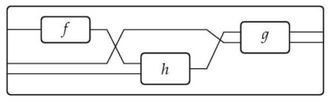
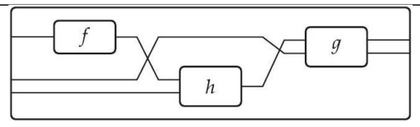
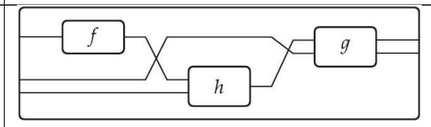
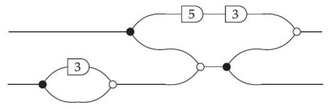
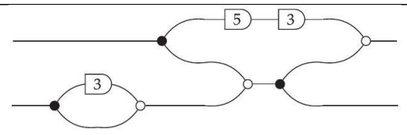
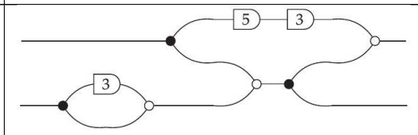
fong-spivak-invitation_DI_292	292	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-292_306_258_1797_810.jpg			
fong-spivak-invitation_DI_292	292	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-292_306_258_1797_1287.jpg			
fong-spivak-invitation_DI_294	294	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-294_206_138_386_386.jpg			
fong-spivak-invitation_DI_294	294	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-294_176_304_404_804.jpg			
fong-spivak-invitation_DI_294	294	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-294_124_418_884_752.jpg			

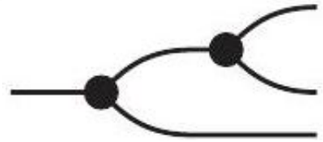
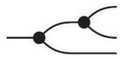
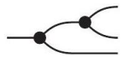
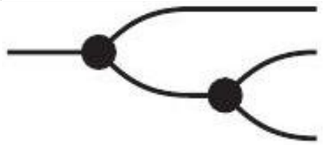
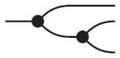
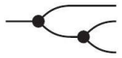
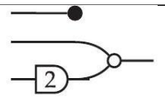
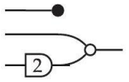
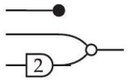
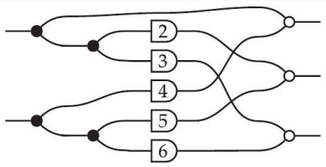
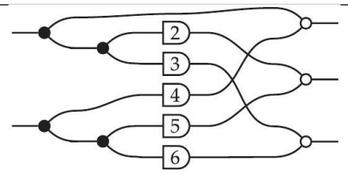
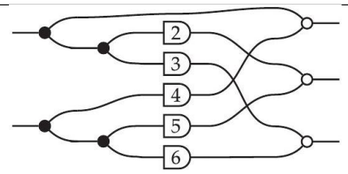
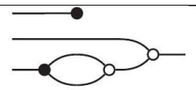
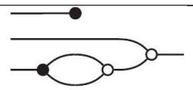
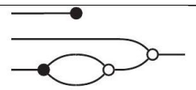
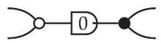
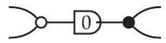
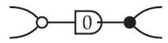
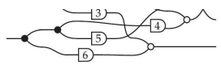
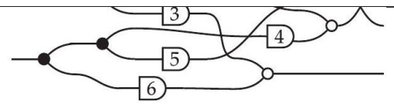
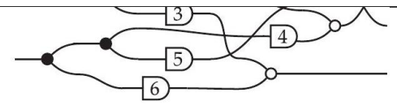
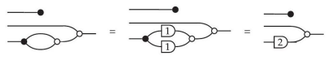
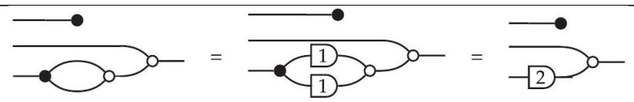
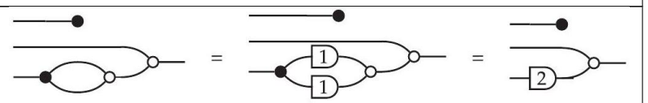
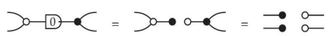
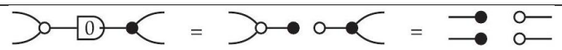
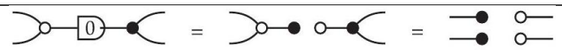
fong-spivak-invitation_DI2_0448	294	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-294_188_448_2013_736.jpg	$\begin{tikzcd} F(c) \arrow[r, "\alpha_c"] \arrow[d, "F(f)"'] & G(c) \arrow[r, "\beta_c"] \arrow[d, "G(f)"'] & H(c) \arrow[d, "H(f)"'] \\ F(c') \arrow[r, "\alpha_c"'] & G(c') \arrow[r, "\beta_c"'] & H(c') \end{tikzcd}$	$\begin{tikzcd} F(c) \arrow[r, "\alpha_c"] \arrow[d, "F(f)"'] & G(c) \arrow[r, "\beta_c"] \arrow[d, "G(f)"'] & H(c) \arrow[d, "H(f)"'] \\ F(c') \arrow[r, "\alpha_c"'] & G(c') \arrow[r, "\beta_c"'] & H(c') \end{tikzcd}$	$\begin{tikzcd} F(c) \arrow[r, "\alpha_c"] \arrow[d, "F(f)"'] & G(c) \arrow[r, "\beta_c"] \arrow[d, "G(f)"'] & H(c) \arrow[d, "H(f)"'] \\ F(c') \arrow[r, "\alpha_c"'] & G(c') \arrow[r, "\beta_c"'] & H(c') \end{tikzcd}$
fong-spivak-invitation_DI2_0448	295	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-295_192_292_398_812.jpg	$\begin{tikzcd} F(c) \arrow[r, "\mathrm{id}_{F(c)}"] \arrow[d, "F(f)"'] & F(c) \arrow[d, "F(f)"] \\ F(c') \arrow[r, "\mathrm{id}_{F(c')}"'] & F(c') \end{tikzcd}$	$\begin{tikzcd} F(c) \arrow[r, "\mathrm{id}_{F(c)}"] \arrow[d, "F(f)"'] & F(c) \arrow[d, "F(f)"] \\ F(c') \arrow[r, "\mathrm{id}_{F(c')}"'] & F(c') \end{tikzcd}$	$\begin{tikzcd} F(c) \arrow[r, "\mathrm{id}_{F(c)}"] \arrow[d, "F(f)"'] & F(c) \arrow[d, "F(f)"] \\ F(c') \arrow[r, "\mathrm{id}_{F(c')}"'] & F(c') \end{tikzcd}$
fong-spivak-invitation_DI2_0448	295	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-295_252_734_1569_570.jpg			
fong-spivak-invitation_DI2_0448	296	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-296_328_550_788_686.jpg			
fong-spivak-invitation_DI2_0448	296	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-296_214_198_1515_552.jpg			
contested: 4 rows *share this crop*						
fong-spivak-invitation_DI2_0448	296	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-296_300_548_1909_996.jpg			
fong-spivak-invitation_DI2_0448	297	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-297_180_700_1741_590.jpg			

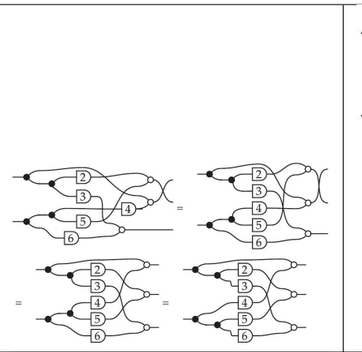
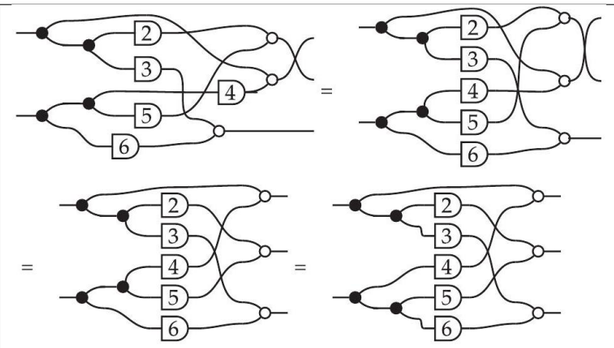
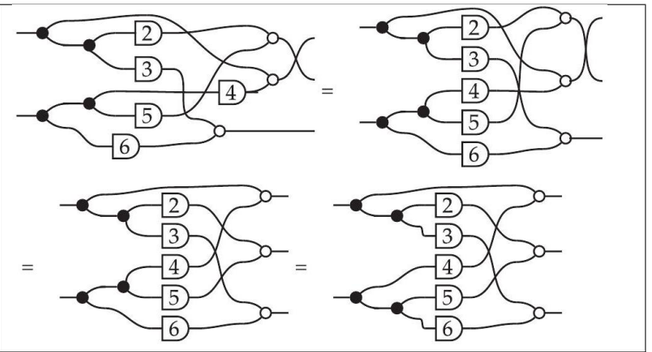
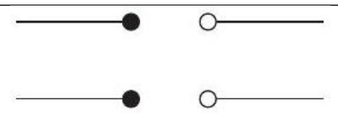
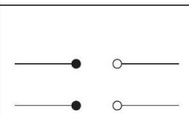
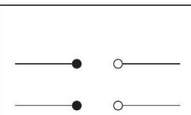
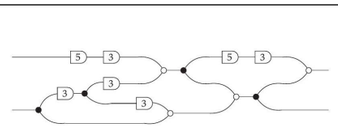
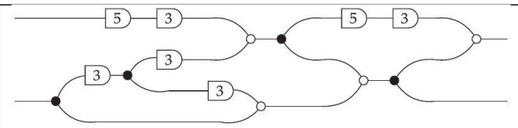
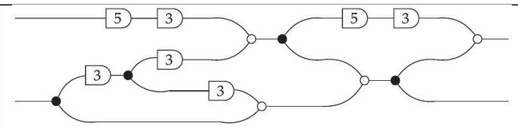
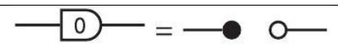
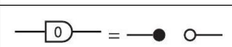
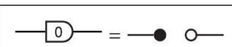
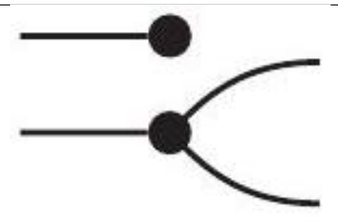
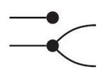
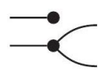
fong-spivak-invitation_DI_0299	299	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-299_372_672_1325_622.jpg			
fong-spivak-invitation_DI_0302	302	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-302_326_852_414_514.jpg			
fong-spivak-invitation_DI_0303	303	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-303_280_662_1024_608.jpg			
fong-spivak-invitation_DI_0304	304	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-304_310_124_1523_692.jpg			

fong-spivak-invitation_DI_0448	304	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-304_296_222_1533_1004.jpg	$\underline{3} \sqcup \underline{3}$	$\underline{3} \sqcup \underline{3}$	$\underline{3} \sqcup \underline{3}$
fong-spivak-invitation_DI_0448	304	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-304_302_226_1937_694.jpg	$\underline{3} \sqcup \underline{3}$	$\underline{3} \sqcup \underline{3}$	$\underline{3} \sqcup \underline{3}$

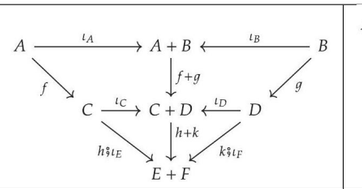
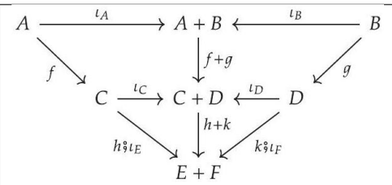
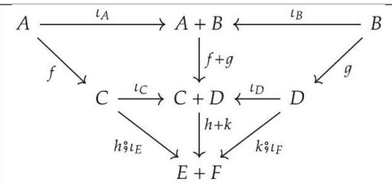
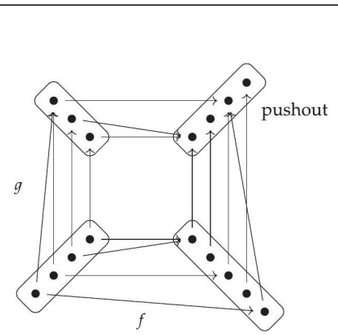
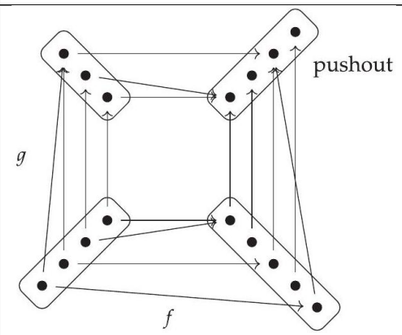
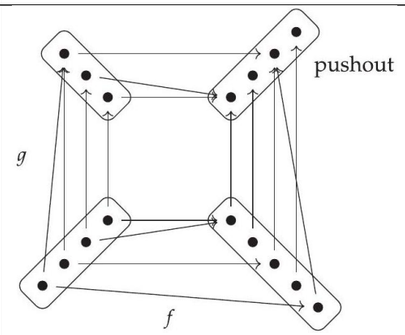
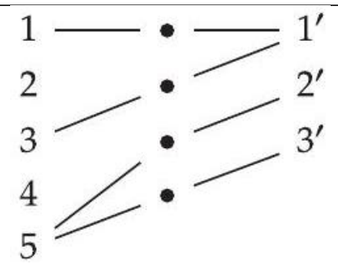
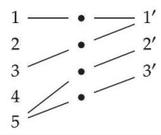
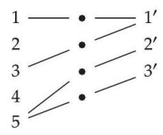
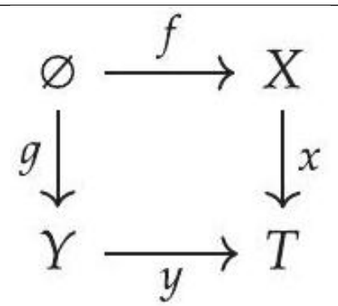
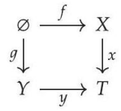
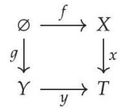
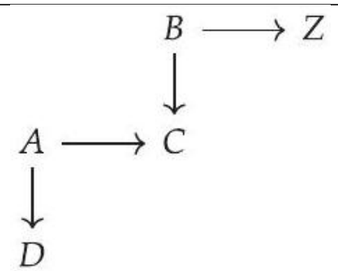
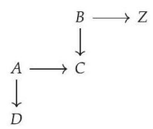
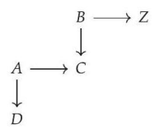
fong-spivak-invitation_DI_0448	304	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-304_308_122_1937_1106.jpg	∅	∅	∅
fong-spivak-invitation_DI_0449	305	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-305_446_1074_338_422.jpg			
fong-spivak-invitation_DI_0450	306	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-306_196_784_1345_568.jpg			
fong-spivak-invitation_DI_0451	306	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-306_192_460_1637_732.jpg			

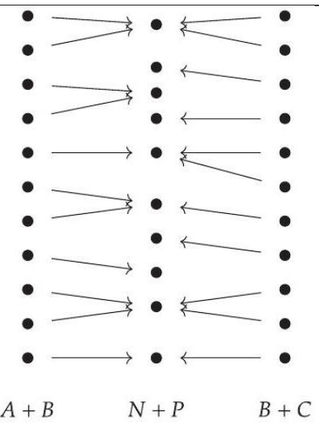
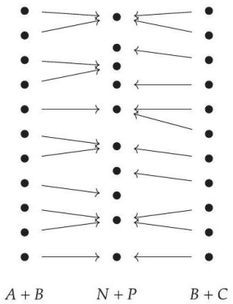
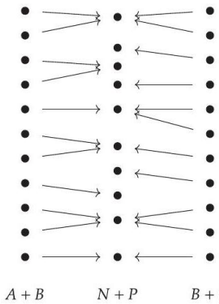
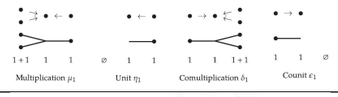
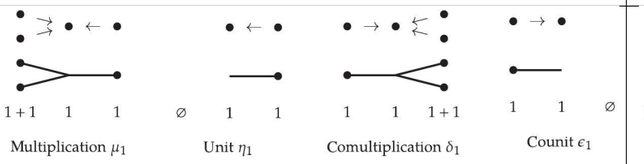
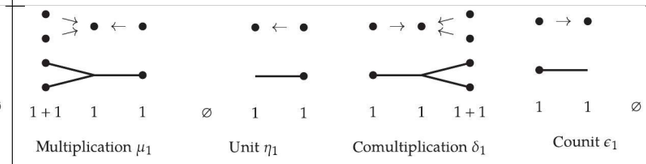
fong-spivak-invitation_DIV_0[illegible]	306	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-306_192_242_2051_410.jpg			
fong-spivak-invitation_DIV_0[illegible]	306	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-306_192_532_2051_976.jpg			
fong-spivak-invitation_DIV_0[illegible]	307	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-307_194_544_346_688.jpg			
fong-spivak-invitation_DIV_0[illegible]	308	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-308_166_560_1719_388.jpg			
fong-spivak-invitation_DIV_0[illegible]	308	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-308_146_494_1737_1000.jpg			
fong-spivak-invitation_DIV_0[illegible]	308	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-308_170_928_1997_476.jpg			
fong-spivak-invitation_DIV_0[illegible]	309	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-309_136_262_518_546.jpg			
fong-spivak-invitation_DIV_0[illegible]	309	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-309_234_278_420_1052.jpg			
fong-spivak-invitation_DIV_0[illegible]	311	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-311_186_648_898_614.jpg			
fong-spivak-invitation_DIV_0[illegible]	312	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-312_202_630_376_626.jpg			

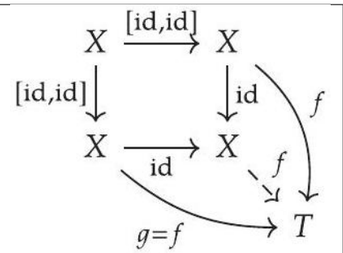
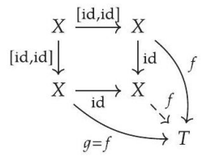
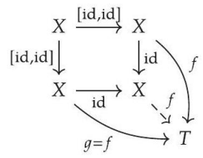
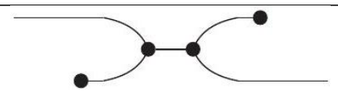
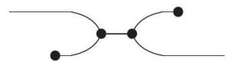
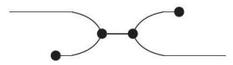
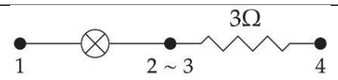
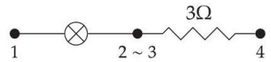
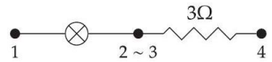
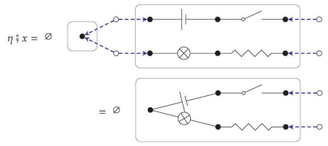
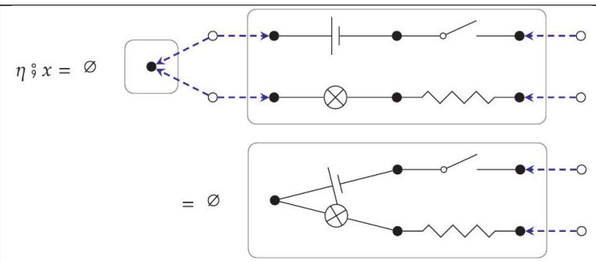
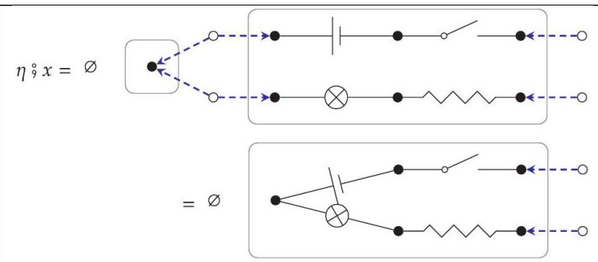
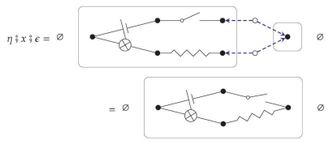
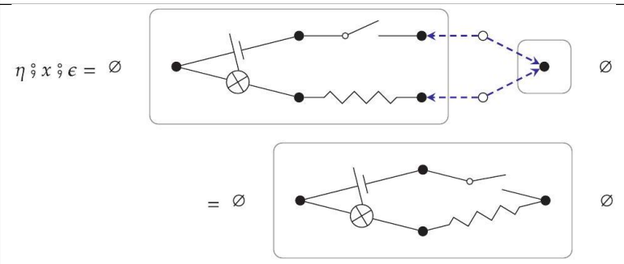
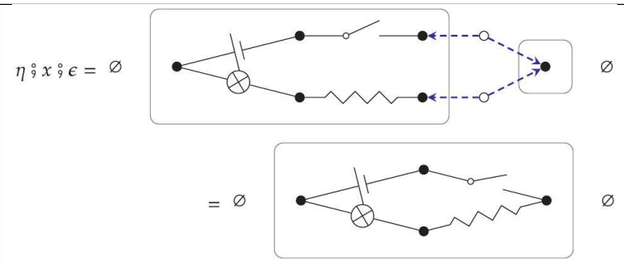
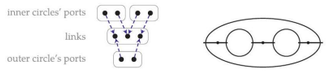
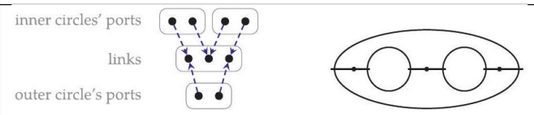
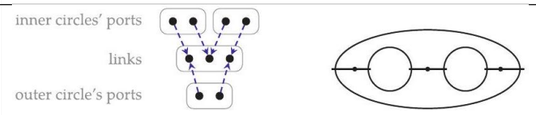
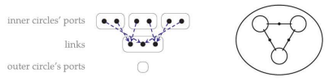
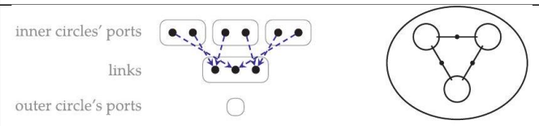
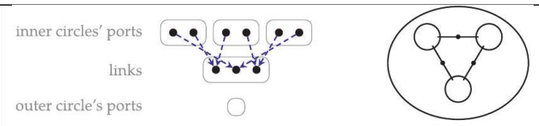
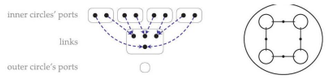
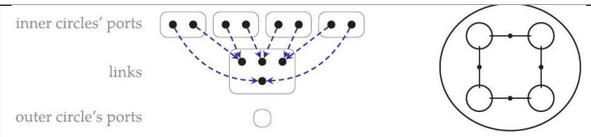
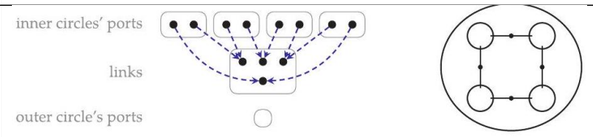
fong-spivak-invitation_DIS_1422	312	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-312_82_184_1162_582.jpg			
fong-spivak-invitation_DIS_1423	312	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-312_84_182_1321_584.jpg			
fong-spivak-invitation_DIS_1424	312	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-312_144_424_1617_752.jpg	$\begin{pmatrix}0\\1\\2\end{pmatrix} \sim$ 	$\begin{pmatrix}0\\1\\2\end{pmatrix} \sim$ 	$\begin{pmatrix}0\\1\\2\end{pmatrix} \sim$ 
fong-spivak-invitation_DIS_1425	312	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-312_102_446_1815_742.jpg	$\begin{pmatrix}0&0\\0&0\end{pmatrix} \sim$	$\begin{pmatrix}0&0\\0&0\end{pmatrix} \sim$	$\begin{pmatrix}0&0\\0&0\end{pmatrix} \sim$
fong-spivak-invitation_DIS_1426	312	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-312_86_144_2075_544.jpg	$\begin{pmatrix}1&2&3\\4&5&6\end{pmatrix}$	$\begin{pmatrix}1&2&3\\4&5&6\end{pmatrix}$	$\begin{pmatrix}1&2&3\\4&5&6\end{pmatrix}$
fong-spivak-invitation_DIS_1427	312	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-312_268_532_1977_848.jpg			
fong-spivak-invitation_DIS_1428	313	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-313_140_514_1649_730.jpg	$\begin{pmatrix}0\\1\\2\end{pmatrix} \sim$ 	$\begin{pmatrix}0\\1\\2\end{pmatrix} \sim$ 	$\begin{pmatrix}0\\1\\2\end{pmatrix} \sim$ 
fong-spivak-invitation_DIS_1429	313	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-313_106_528_1847_724.jpg	$\begin{pmatrix}0&0\\0&0\end{pmatrix} \sim$ 	$\begin{pmatrix}0&0\\0&0\end{pmatrix} \sim$ 	$\begin{pmatrix}0&0\\0&0\end{pmatrix} \sim$ 
fong-spivak-invitation_DIS_1430	313	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-313_154_912_2091_528.jpg	$\begin{pmatrix}1&2&3\\4&5&6\end{pmatrix} \sim$ 	$\begin{pmatrix}1&2&3\\4&5&6\end{pmatrix} \sim$ 	$\begin{pmatrix}1&2&3\\4&5&6\end{pmatrix} \sim$ 
fong-spivak-invitation_DIS_1431	314	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-314_156_1006_420_484.jpg			
fong-spivak-invitation_DIS_1432	314	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-314_70_876_650_548.jpg			

fong-spivak-invitation_DIS_1446	314	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-314_544_954_800_510.jpg			
fong-spivak-invitation_DIS_1446	314	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-314_92_274_1573_374.jpg			
fong-spivak-invitation_DIS_1446	314	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-314_192_800_1521_750.jpg			
fong-spivak-invitation_DIS_1446	314	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-314_42_342_1887_790.jpg			
fong-spivak-invitation_DIS_1446	314	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-314_98_148_2147_888.jpg			
fong-spivak-invitation_DIS_1446	315	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-315_184_388_740_400.jpg	$\begin{tikzcd} (a,b,c) \arrow[r, mapsto, "(\mu\otimes\mathrm{id})"] \arrow[d, mapsto, "(\mathrm{id}\otimes\mu)"'] & (a*b,c) \arrow[d, mapsto, "\mu"] \\ (a,b*c) \arrow[r, mapsto, "\mu"'] & a*b*c \end{tikzcd}$	$\begin{tikzcd} (a,b,c) \arrow[r, mapsto, "(\mu\otimes\mathrm{id})"] \arrow[d, mapsto, "(\mathrm{id}\otimes\mu)"'] & (a*b,c) \arrow[d, mapsto, "\mu"] \\ (a,b*c) \arrow[r, mapsto, "\mu"'] & a*b*c \end{tikzcd}$	$\begin{tikzcd} (a,b,c) \arrow[r, mapsto, "(\mu\otimes\mathrm{id})"] \arrow[d, mapsto, "(\mathrm{id}\otimes\mu)"'] & (a*b,c) \arrow[d, mapsto, "\mu"] \\ (a,b*c) \arrow[r, mapsto, "\mu"'] & a*b*c \end{tikzcd}$
fong-spivak-invitation_DIS_1446	315	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-315_182_320_742_864.jpg	$\begin{tikzcd} a \arrow[r, mapsto, "(\eta\otimes\mathrm{id})"] \arrow[d, mapsto, "(\mathrm{id}\otimes\eta)"'] \arrow[dr, mapsto, "\mathrm{id}_a"] & (1,a) \arrow[d, mapsto, "\mu"] \\ (a,1) \arrow[r, mapsto, "\mu"'] & a \end{tikzcd}$	$\begin{tikzcd} a \arrow[r, mapsto, "(\eta\otimes\mathrm{id})"] \arrow[d, mapsto, "(\mathrm{id}\otimes\eta)"'] \arrow[dr, mapsto, "\mathrm{id}_a"] & (1,a) \arrow[d, mapsto, "\mu"] \\ (a,1) \arrow[r, mapsto, "\mu"'] & a \end{tikzcd}$	$\begin{tikzcd} a \arrow[r, mapsto, "(\eta\otimes\mathrm{id})"] \arrow[d, mapsto, "(\mathrm{id}\otimes\eta)"'] \arrow[dr, mapsto, "\mathrm{id}_a"] & (1,a) \arrow[d, mapsto, "\mu"] \\ (a,1) \arrow[r, mapsto, "\mu"'] & a \end{tikzcd}$
fong-spivak-invitation_DIS_1446	315	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-315_152_248_760_1269.jpg	$\begin{tikzcd} (a,b) \arrow[r, mapsto, "\sigma"] \arrow[dr, mapsto, "\mu"'] & (b,a) \arrow[d, mapsto, "\mu"] \\ & a*b \end{tikzcd}$	$\begin{tikzcd} (a,b) \arrow[r, mapsto, "\sigma"] \arrow[dr, mapsto, "\mu"'] & (b,a) \arrow[d, mapsto, "\mu"] \\ & a*b \end{tikzcd}$	$\begin{tikzcd} (a,b) \arrow[r, mapsto, "\sigma"] \arrow[dr, mapsto, "\mu"'] & (b,a) \arrow[d, mapsto, "\mu"] \\ & a*b \end{tikzcd}$
fong-spivak-invitation_DIS_1446	315	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-315_184_380_1056_404.jpg	$\begin{tikzcd} (a,b,c) \arrow[r, mapsto, "(\mu\otimes\mathrm{id})"] \arrow[d, mapsto, "(\mathrm{id}\otimes\mu)"'] & (a+b,c) \arrow[d, mapsto, "\mu"] \\ (a,b+c) \arrow[r, mapsto, "\mu"'] & a+b+c \end{tikzcd}$	$\begin{tikzcd} (a,b,c) \arrow[r, mapsto, "(\mu\otimes\mathrm{id})"] \arrow[d, mapsto, "(\mathrm{id}\otimes\mu)"'] & (a+b,c) \arrow[d, mapsto, "\mu"] \\ (a,b+c) \arrow[r, mapsto, "\mu"'] & a+b+c \end{tikzcd}$	$\begin{tikzcd} (a,b,c) \arrow[r, mapsto, "(\mu\otimes\mathrm{id})"] \arrow[d, mapsto, "(\mathrm{id}\otimes\mu)"'] & (a+b,c) \arrow[d, mapsto, "\mu"] \\ (a,b+c) \arrow[r, mapsto, "\mu"'] & a+b+c \end{tikzcd}$

fong-spivak-invitation_DIS_1452	315	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-315_182_322_1058_860.jpg	$\begin{tikzcd} a \arrow[r, mapsto, "(\eta\otimes\mathrm{id})"] \arrow[d, mapsto, "(\mathrm{id}\otimes\eta)"'] \arrow[dr, mapsto, "\mathrm{id}_a"] & (0,a) \arrow[d, mapsto, "\mu"] \\ (a,0) \arrow[r, mapsto, "\mu"'] & a \end{tikzcd}$	$\begin{tikzcd} a \arrow[r, mapsto, "(\eta\otimes\mathrm{id})"] \arrow[d, mapsto, "(\mathrm{id}\otimes\eta)"'] \arrow[dr, mapsto, "\mathrm{id}_a"] & (0,a) \arrow[d, mapsto, "\mu"] \\ (a,0) \arrow[r, mapsto, "\mu"'] & a \end{tikzcd}$	$\begin{tikzcd} a \arrow[r, mapsto, "(\eta\otimes\mathrm{id})"] \arrow[d, mapsto, "(\mathrm{id}\otimes\eta)"'] \arrow[dr, mapsto, "\mathrm{id}_a"] & (0,a) \arrow[d, mapsto, "\mu"] \\ (a,0) \arrow[r, mapsto, "\mu"'] & a \end{tikzcd}$
fong-spivak-invitation_DIS_1453	315	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-315_152_248_1076_1265.jpg	$\begin{tikzcd} (a,b) \arrow[r, mapsto, "\sigma"] \arrow[dr, mapsto, "\mu"'] & (b,a) \arrow[d, mapsto, "\mu"] \\ & a+b \end{tikzcd}$	$\begin{tikzcd} (a,b) \arrow[r, mapsto, "\sigma"] \arrow[dr, mapsto, "\mu"'] & (b,a) \arrow[d, mapsto, "\mu"] \\ & a+b \end{tikzcd}$	$\begin{tikzcd} (a,b) \arrow[r, mapsto, "\sigma"] \arrow[dr, mapsto, "\mu"'] & (b,a) \arrow[d, mapsto, "\mu"] \\ & a+b \end{tikzcd}$
fong-spivak-invitation_DIS_1454	317	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-317_74_94_1443_1028.jpg	$\begin{tikzcd} a & b \end{tikzcd}$	$\begin{tikzcd} a & b \end{tikzcd}$	$\begin{tikzcd} a & b \end{tikzcd}$
fong-spivak-invitation_DIS_1455	317	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-317_72_114_1445_1166.jpg	$\begin{tikzcd} a \arrow[r] & b \end{tikzcd}$	$\begin{tikzcd} a \arrow[r] & b \end{tikzcd}$	$\begin{tikzcd} a \arrow[r] & b \end{tikzcd}$
fong-spivak-invitation_DIS_1456	317	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-317_76_110_1445_1327.jpg	$\begin{tikzcd} a \arrow[r, shift left] & b \arrow[l, shift left] \end{tikzcd}$	$\begin{tikzcd} a \arrow[r, shift left] & b \arrow[l, shift left] \end{tikzcd}$	$\begin{tikzcd} a \arrow[r, shift left] & b \arrow[l, shift left] \end{tikzcd}$
fong-spivak-invitation_DIS_1457	319	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-319_306_394_978_760.jpg	$\begin{tikzcd} A \arrow[r, "\iota_A"] \arrow[dr, "f"] \arrow[ddr, "f\fatsemi h"'] & A+B \arrow[d, dashed, "{[f,g]}"] & B \arrow[l, "\iota_B"'] \arrow[dl, "g"'] \arrow[ddl, "g\fatsemi h"] \\ & C \arrow[d, "h"] & \\ & D & \end{tikzcd}$	$\begin{tikzcd} A \arrow[r, "\iota_A"] \arrow[dr, "f"] \arrow[ddr, "f\fatsemi h"'] & A+B \arrow[d, dashed, "{[f,g]}"] & B \arrow[l, "\iota_B"'] \arrow[dl, "g"'] \arrow[ddl, "g\fatsemi h"] \\ & C \arrow[d, "h"] & \\ & D & \end{tikzcd}$	$\begin{tikzcd} A \arrow[r, "\iota_A"] \arrow[dr, "f"] \arrow[ddr, "f\fatsemi h"'] & A+B \arrow[d, dashed, "{[f,g]}"] & B \arrow[l, "\iota_B"'] \arrow[dl, "g"'] \arrow[ddl, "g\fatsemi h"] \\ & C \arrow[d, "h"] & \\ & D & \end{tikzcd}$
fong-spivak-invitation_DIS_1458	319	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-319_194_316_1455_800.jpg	$\begin{tikzcd} A \arrow[r, "\iota_A"] \arrow[dr, "\iota_A"'] & A+B \arrow[d, equal, "\mathrm{id}_{A+B}"] & B \arrow[l, "\iota_B"'] \arrow[dl, "\iota_B"] \\ & A+B & \end{tikzcd}$	$\begin{tikzcd} A \arrow[r, "\iota_A"] \arrow[dr, "\iota_A"'] & A+B \arrow[d, equal, "\mathrm{id}_{A+B}"] & B \arrow[l, "\iota_B"'] \arrow[dl, "\iota_B"] \\ & A+B & \end{tikzcd}$	$\begin{tikzcd} A \arrow[r, "\iota_A"] \arrow[dr, "\iota_A"'] & A+B \arrow[d, equal, "\mathrm{id}_{A+B}"] & B \arrow[l, "\iota_B"'] \arrow[dl, "\iota_B"] \\ & A+B & \end{tikzcd}$

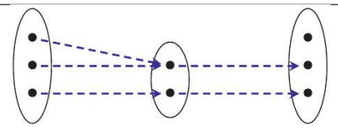
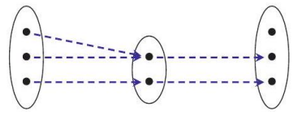
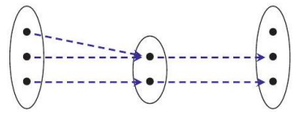
fong-spivak-invitation_DIS_2nd0	320	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-320_284_598_724_662.jpg			
fong-spivak-invitation_DIS_2nd0	321	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-321_524_616_436_630.jpg			
fong-spivak-invitation_DIS_2nd1	321	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-321_196_244_1164_816.jpg			
fong-spivak-invitation_DIS_2nd2	321	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-321_172_180_1909_870.jpg			
fong-spivak-invitation_DIS_2nd3	322	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-322_192_230_410_588.jpg			

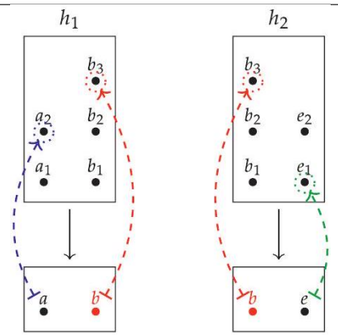
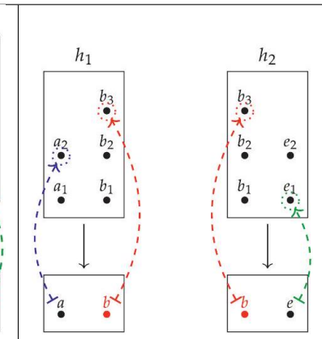
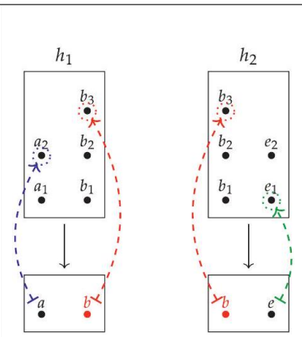
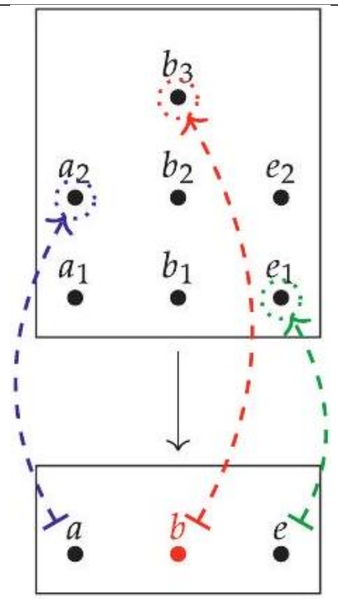
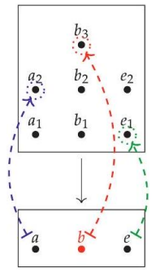
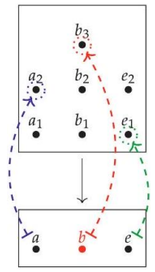
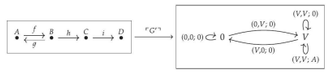
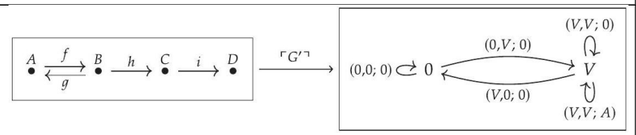
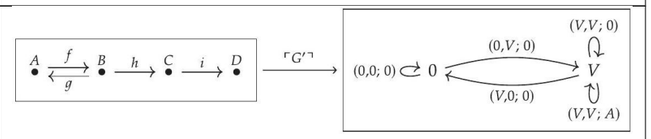
fong-spivak-invitation_DIS_2022	322	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-322_198_234_406_1060.jpg	$\begin{tikzcd} & B \arrow[r] \arrow[d] & Z \arrow[d] \\ A \arrow[r] \arrow[d] & Y \arrow[r] \arrow[d] \arrow[dr, phantom, "\ulcorner", very near start] & R \arrow[d] \\ X \arrow[r] & Q \arrow[r] \arrow[ur, phantom, "\ulcorner", very near start] & S \end{tikzcd}$	$\begin{tikzcd} & B \arrow[r] \arrow[d] & Z \arrow[d] \\ A \arrow[r] \arrow[d] & Y \arrow[r] \arrow[d] \arrow[dr, phantom, "\ulcorner", very near start] & R \arrow[d] \\ X \arrow[r] & Q \arrow[r] \arrow[ur, phantom, "\ulcorner", very near start] & S \end{tikzcd}$	$\begin{tikzcd} & B \arrow[r] \arrow[d] & Z \arrow[d] \\ A \arrow[r] \arrow[d] & Y \arrow[r] \arrow[d] \arrow[dr, phantom, "\ulcorner", very near start] & R \arrow[d] \\ X \arrow[r] & Q \arrow[r] \arrow[ur, phantom, "\ulcorner", very near start] & S \end{tikzcd}$
fong-spivak-invitation_DIS_2022	322	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-322_214_256_756_812.jpg	$\begin{tikzcd} & B \arrow[r] \arrow[d] & Z \arrow[dd] \\ A \arrow[r] \arrow[d] & Y \arrow[dr] & \\ X \arrow[rr] & & T \end{tikzcd}$	$\begin{tikzcd} & B \arrow[r] \arrow[d] & Z \arrow[dd] \\ A \arrow[r] \arrow[d] & Y \arrow[dr] & \\ X \arrow[rr] & & T \end{tikzcd}$	$\begin{tikzcd} & B \arrow[r] \arrow[d] & Z \arrow[dd] \\ A \arrow[r] \arrow[d] & Y \arrow[dr] & \\ X \arrow[rr] & & T \end{tikzcd}$
fong-spivak-invitation_DIS_2022	322	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-322_480_368_1703_756.jpg			
fong-spivak-invitation_DIS_2022	323	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-323_300_1221_1144_328.jpg			
fong-spivak-invitation_DIS_2022	323	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-323_172_274_1739_802.jpg	$\begin{tikzcd} X + X \arrow[r, "{[\mathrm{id},\mathrm{id}]}"] \arrow[d, "{[\mathrm{id},\mathrm{id}]}"'] & X \arrow[d, "\mathrm{id}"] \\ X \arrow[r, "\mathrm{id}"'] & X \end{tikzcd}$	$\begin{tikzcd} X + X \arrow[r, "{[\mathrm{id},\mathrm{id}]}"] \arrow[d, "{[\mathrm{id},\mathrm{id}]}"'] & X \arrow[d, "\mathrm{id}"] \\ X \arrow[r, "\mathrm{id}"'] & X \end{tikzcd}$	$\begin{tikzcd} X + X \arrow[r, "{[\mathrm{id},\mathrm{id}]}"] \arrow[d, "{[\mathrm{id},\mathrm{id}]}"'] & X \arrow[d, "\mathrm{id}"] \\ X \arrow[r, "\mathrm{id}"'] & X \end{tikzcd}$
fong-spivak-invitation_DIS_2022	323	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-323_172_266_2031_806.jpg	$\begin{tikzcd} X + X \arrow[r, "{[\mathrm{id},\mathrm{id}]}"] \arrow[d, "{[\mathrm{id},\mathrm{id}]}"'] & X \arrow[d, "f"] \\ X \arrow[r, "g"'] & T \end{tikzcd}$	$\begin{tikzcd} X + X \arrow[r, "{[\mathrm{id},\mathrm{id}]}"] \arrow[d, "{[\mathrm{id},\mathrm{id}]}"'] & X \arrow[d, "f"] \\ X \arrow[r, "g"'] & T \end{tikzcd}$	$\begin{tikzcd} X + X \arrow[r, "{[\mathrm{id},\mathrm{id}]}"] \arrow[d, "{[\mathrm{id},\mathrm{id}]}"'] & X \arrow[d, "f"] \\ X \arrow[r, "g"'] & T \end{tikzcd}$

fong-spivak-invitation_DIS_2018	324	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-324_242_310_470_786.jpg			
fong-spivak-invitation_DIS_2018	324	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-324_92_352_984_764.jpg			
fong-spivak-invitation_DIS_2018	325	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-325_94_420_766_728.jpg			
fong-spivak-invitation_DIS_2018	325	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-325_68_618_1084_630.jpg			
fong-spivak-invitation_DIS_2018	326	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-326_410_932_492_476.jpg			
fong-spivak-invitation_DIS_2018	326	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-326_412_970_1016_456.jpg			
fong-spivak-invitation_DIS_2018	326	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-326_176_828_1641_548.jpg			
fong-spivak-invitation_DIS_2018	326	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-326_192_836_2057_544.jpg			
fong-spivak-invitation_DIS_2018	327	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-327_210_922_358_498.jpg			

fong-spivak-invitation_DIS_2479	327	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-327_182_328_1018_772.jpg	$\begin{tikzcd} A \arrow[r, "f"] \arrow[d, "h_1"] & B \arrow[r, "g"] \arrow[d, "h_2"] \arrow[dr, phantom, "\lrcorner", very near start] & C \arrow[d, "h_3"] \\ A' \arrow[r, "f'"'] & B' \arrow[r, "g'"'] & C' \end{tikzcd}$	$\begin{tikzcd} A \arrow[r, "f"] \arrow[d, "h_1"] & B \arrow[r, "g"] \arrow[d, "h_2"] \arrow[dr, phantom, "\lrcorner", very near start] & C \arrow[d, "h_3"] \\ A' \arrow[r, "f'"'] & B' \arrow[r, "g'"'] & C' \end{tikzcd}$	$\begin{tikzcd} A \arrow[r, "f"] \arrow[d, "h_1"] & B \arrow[r, "g"] \arrow[d, "h_2"] \arrow[dr, phantom, "\lrcorner", very near start] & C \arrow[d, "h_3"] \\ A' \arrow[r, "f'"'] & B' \arrow[r, "g'"'] & C' \end{tikzcd}$
fong-spivak-invitation_DIS_2480	327	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-327_250_386_1431_746.jpg	$\begin{tikzcd} X \arrow[drr, bend left, "p"] \arrow[dd, bend right, "q"'] & & \\ & A \arrow[r, "f"] \arrow[d, "h_1"] & B \arrow[r, "g"] \arrow[d, "h_2"] \arrow[dr, phantom, "\lrcorner", very near start] & C \arrow[d, "h_3"] \\ & A' \arrow[r, "f'"'] & B' \arrow[r, "g'"'] & C' \end{tikzcd}$	$\begin{tikzcd} X \arrow[drr, bend left, "p"] \arrow[dd, bend right, "q"'] & & \\ & A \arrow[r, "f"] \arrow[d, "h_1"] & B \arrow[r, "g"] \arrow[d, "h_2"] \arrow[dr, phantom, "\lrcorner", very near start] & C \arrow[d, "h_3"] \\ & A' \arrow[r, "f'"'] & B' \arrow[r, "g'"'] & C' \end{tikzcd}$	$\begin{tikzcd} X \arrow[drr, bend left, "p"] \arrow[dd, bend right, "q"'] & & \\ & A \arrow[r, "f"] \arrow[d, "h_1"] & B \arrow[r, "g"] \arrow[d, "h_2"] \arrow[dr, phantom, "\lrcorner", very near start] & C \arrow[d, "h_3"] \\ & A' \arrow[r, "f'"'] & B' \arrow[r, "g'"'] & C' \end{tikzcd}$
fong-spivak-invitation_DIS_2481	327	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-327_248_324_1835_464.jpg	$\begin{tikzcd} X \arrow[drr, bend left, "p"] \arrow[dr, dashed, "r"] \arrow[ddr, bend right, "q \fatsemi f'"'] & & \\ & B \arrow[r, "g"] \arrow[d, "h_2"] \arrow[dr, phantom, "\lrcorner", very near start] & C \arrow[d, "h_3"] \\ & B' \arrow[r, "g'"'] & C' \end{tikzcd}$	$\begin{tikzcd} X \arrow[drr, bend left, "p"] \arrow[dr, dashed, "r"] \arrow[ddr, bend right, "q \fatsemi f'"'] & & \\ & B \arrow[r, "g"] \arrow[d, "h_2"] \arrow[dr, phantom, "\lrcorner", very near start] & C \arrow[d, "h_3"] \\ & B' \arrow[r, "g'"'] & C' \end{tikzcd}$	$\begin{tikzcd} X \arrow[drr, bend left, "p"] \arrow[dr, dashed, "r"] \arrow[ddr, bend right, "q \fatsemi f'"'] & & \\ & B \arrow[r, "g"] \arrow[d, "h_2"] \arrow[dr, phantom, "\lrcorner", very near start] & C \arrow[d, "h_3"] \\ & B' \arrow[r, "g'"'] & C' \end{tikzcd}$
fong-spivak-invitation_DIS_2482	327	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-327_248_384_1837_1028.jpg	$\begin{tikzcd} X \arrow[drr, bend left, "r"] \arrow[dr, dashed, "r'"] \arrow[ddr, bend right, "q"'] & & \\ & A \arrow[r, "f"] \arrow[d, "h_1"] & B \arrow[r, "g"] \arrow[d, "h_2"] \arrow[dr, phantom, "\lrcorner", very near start] & C \arrow[d, "h_3"] \\ & A' \arrow[r, "f'"'] & B' \arrow[r, "g'"'] & C' \end{tikzcd}$	$\begin{tikzcd} X \arrow[drr, bend left, "r"] \arrow[dr, dashed, "r'"] \arrow[ddr, bend right, "q"'] & & \\ & A \arrow[r, "f"] \arrow[d, "h_1"] & B \arrow[r, "g"] \arrow[d, "h_2"] \arrow[dr, phantom, "\lrcorner", very near start] & C \arrow[d, "h_3"] \\ & A' \arrow[r, "f'"'] & B' \arrow[r, "g'"'] & C' \end{tikzcd}$	$\begin{tikzcd} X \arrow[drr, bend left, "r"] \arrow[dr, dashed, "r'"] \arrow[ddr, bend right, "q"'] & & \\ & A \arrow[r, "f"] \arrow[d, "h_1"] & B \arrow[r, "g"] \arrow[d, "h_2"] \arrow[dr, phantom, "\lrcorner", very near start] & C \arrow[d, "h_3"] \\ & A' \arrow[r, "f'"'] & B' \arrow[r, "g'"'] & C' \end{tikzcd}$
fong-spivak-invitation_DIS_2483	328	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-328_250_384_376_748.jpg	$\begin{tikzcd} X \arrow[drr, bend left, "p"] \arrow[dr, "r_0"] \arrow[ddr, bend right, "q"'] & & \\ & A \arrow[r, "f"] \arrow[d, "h_1"] & B \arrow[r, "g"] \arrow[d, "h_2"] \arrow[dr, phantom, "\lrcorner", very near start] & C \arrow[d, "h_3"] \\ & A' \arrow[r, "f'"'] & B' \arrow[r, "g'"'] & C' \end{tikzcd}$	$\begin{tikzcd} X \arrow[drr, bend left, "p"] \arrow[dr, "r_0"] \arrow[ddr, bend right, "q"'] & & \\ & A \arrow[r, "f"] \arrow[d, "h_1"] & B \arrow[r, "g"] \arrow[d, "h_2"] \arrow[dr, phantom, "\lrcorner", very near start] & C \arrow[d, "h_3"] \\ & A' \arrow[r, "f'"'] & B' \arrow[r, "g'"'] & C' \end{tikzcd}$	$\begin{tikzcd} X \arrow[drr, bend left, "p"] \arrow[dr, "r_0"] \arrow[ddr, bend right, "q"'] & & \\ & A \arrow[r, "f"] \arrow[d, "h_1"] & B \arrow[r, "g"] \arrow[d, "h_2"] \arrow[dr, phantom, "\lrcorner", very near start] & C \arrow[d, "h_3"] \\ & A' \arrow[r, "f'"'] & B' \arrow[r, "g'"'] & C' \end{tikzcd}$
fong-spivak-invitation_DIS_2484	328	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-328_246_384_878_748.jpg	$\begin{tikzcd} X \arrow[drr, bend left, "r"] \arrow[ddr, bend right, "q"'] & & \\ & A \arrow[r, "f"] \arrow[d, "h_1"] & B \arrow[r, "g"] \arrow[d, "h_2"] \arrow[dr, phantom, "\lrcorner", very near start] & C \arrow[d, "h_3"] \\ & A' \arrow[r, "f'"'] & B' \arrow[r, "g'"'] & C' \end{tikzcd}$	$\begin{tikzcd} X \arrow[drr, bend left, "r"] \arrow[ddr, bend right, "q"'] & & \\ & A \arrow[r, "f"] \arrow[d, "h_1"] & B \arrow[r, "g"] \arrow[d, "h_2"] \arrow[dr, phantom, "\lrcorner", very near start] & C \arrow[d, "h_3"] \\ & A' \arrow[r, "f'"'] & B' \arrow[r, "g'"'] & C' \end{tikzcd}$	$\begin{tikzcd} X \arrow[drr, bend left, "r"] \arrow[ddr, bend right, "q"'] & & \\ & A \arrow[r, "f"] \arrow[d, "h_1"] & B \arrow[r, "g"] \arrow[d, "h_2"] \arrow[dr, phantom, "\lrcorner", very near start] & C \arrow[d, "h_3"] \\ & A' \arrow[r, "f'"'] & B' \arrow[r, "g'"'] & C' \end{tikzcd}$
fong-spivak-invitation_DIS_2485	328	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-328_250_384_1383_748.jpg	$\begin{tikzcd} X \arrow[drr, bend left, "p"] \arrow[dr, "r'"] \arrow[dr, bend left, "r"] \arrow[ddr, bend right, "q"'] & & \\ & A \arrow[r, "f"] \arrow[d, "h_1"] & B \arrow[r, "g"] \arrow[d, "h_2"] \arrow[dr, phantom, "\lrcorner", very near start] & C \arrow[d, "h_3"] \\ & A' \arrow[r, "f'"'] & B' \arrow[r, "g'"'] & C' \end{tikzcd}$	$\begin{tikzcd} X \arrow[drr, bend left, "p"] \arrow[dr, "r'"] \arrow[dr, bend left, "r"] \arrow[ddr, bend right, "q"'] & & \\ & A \arrow[r, "f"] \arrow[d, "h_1"] & B \arrow[r, "g"] \arrow[d, "h_2"] \arrow[dr, phantom, "\lrcorner", very near start] & C \arrow[d, "h_3"] \\ & A' \arrow[r, "f'"'] & B' \arrow[r, "g'"'] & C' \end{tikzcd}$	$\begin{tikzcd} X \arrow[drr, bend left, "p"] \arrow[dr, "r'"] \arrow[dr, bend left, "r"] \arrow[ddr, bend right, "q"'] & & \\ & A \arrow[r, "f"] \arrow[d, "h_1"] & B \arrow[r, "g"] \arrow[d, "h_2"] \arrow[dr, phantom, "\lrcorner", very near start] & C \arrow[d, "h_3"] \\ & A' \arrow[r, "f'"'] & B' \arrow[r, "g'"'] & C' \end{tikzcd}$

fong-spivak-invitation_DIS_2018	328	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-328_234_264_2011_808.jpg	$\begin{tikzcd} X \arrow[dr, dashed] \arrow[drr, bend left, "g_2"] \arrow[ddr, bend right, "g_1"'] & & \\ & A \arrow[r, "\mathrm{id}_A"] \arrow[d, "\mathrm{id}_A"'] \arrow[dr, phantom, "\lrcorner", very near start] & A \arrow[d, "f"] \\ & A \arrow[r, "f"'] & B \end{tikzcd}$	$\begin{tikzcd} X \arrow[dr, dashed] \arrow[drr, bend left, "g_2"] \arrow[ddr, bend right, "g_1"'] & & \\ & A \arrow[r, "\mathrm{id}_A"] \arrow[d, "\mathrm{id}_A"'] \arrow[dr, phantom, "\lrcorner", very near start] & A \arrow[d, "f"] \\ & A \arrow[r, "f"'] & B \end{tikzcd}$	$\begin{tikzcd} X \arrow[dr, dashed] \arrow[drr, bend left, "g_2"] \arrow[ddr, bend right, "g_1"'] & & \\ & A \arrow[r, "\mathrm{id}_A"] \arrow[d, "\mathrm{id}_A"'] \arrow[dr, phantom, "\lrcorner", very near start] & A \arrow[d, "f"] \\ & A \arrow[r, "f"'] & B \end{tikzcd}$
fong-spivak-invitation_DIS_2018	329	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-329_180_184_764_868.jpg	$\begin{tikzcd} A' \arrow[r, "f'"] \arrow[d, "i'"'] \arrow[dr, phantom, "\lrcorner", very near start] & B' \arrow[d, "i", "\cong"'] \\ A \arrow[r, "f"'] & B \end{tikzcd}$	$\begin{tikzcd} A' \arrow[r, "f'"] \arrow[d, "i'"'] \arrow[dr, phantom, "\lrcorner", very near start] & B' \arrow[d, "i", "\cong"'] \\ A \arrow[r, "f"'] & B \end{tikzcd}$	$\begin{tikzcd} A' \arrow[r, "f'"] \arrow[d, "i'"'] \arrow[dr, phantom, "\lrcorner", very near start] & B' \arrow[d, "i", "\cong"'] \\ A \arrow[r, "f"'] & B \end{tikzcd}$
fong-spivak-invitation_DIS_2018	329	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-329_180_156_1249_880.jpg	$\begin{tikzcd} A \arrow[r, "f"] \arrow[d, equal] \arrow[dr, phantom, "\lrcorner", very near start] & B \arrow[d, equal] \\ A \arrow[r, "f"'] & B \end{tikzcd}$	$\begin{tikzcd} A \arrow[r, "f"] \arrow[d, equal] \arrow[dr, phantom, "\lrcorner", very near start] & B \arrow[d, equal] \\ A \arrow[r, "f"'] & B \end{tikzcd}$	$\begin{tikzcd} A \arrow[r, "f"] \arrow[d, equal] \arrow[dr, phantom, "\lrcorner", very near start] & B \arrow[d, equal] \\ A \arrow[r, "f"'] & B \end{tikzcd}$
fong-spivak-invitation_DIS_2018	329	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-329_280_334_1773_486.jpg	$\begin{tikzcd} & & A \arrow[dl, equal] \arrow[dl, equal] \arrow[d, equal] & \\ & A' \arrow[r, "g"] \arrow[d, "f'"'] & A \arrow[d, "f"] & \\ A' \arrow[r, "g"] \arrow[dr, "f'"'] & A \arrow[r, "f"] \arrow[d, "f"] & B \\ & B' \arrow[r, "h"'] & B \end{tikzcd}$	$\begin{tikzcd} & & A \arrow[dl, equal] \arrow[dl, equal] \arrow[d, equal] & \\ & A' \arrow[r, "g"] \arrow[d, "f'"'] & A \arrow[d, "f"] & \\ A' \arrow[r, "g"] \arrow[dr, "f'"'] & A \arrow[r, "f"] \arrow[d, "f"] & B \\ & B' \arrow[r, "h"'] & B \end{tikzcd}$	$\begin{tikzcd} & & A \arrow[dl, equal] \arrow[dl, equal] \arrow[d, equal] & \\ & A' \arrow[r, "g"] \arrow[d, "f'"'] & A \arrow[d, "f"] & \\ A' \arrow[r, "g"] \arrow[dr, "f'"'] & A \arrow[r, "f"] \arrow[d, "f"] & B \\ & B' \arrow[r, "h"'] & B \end{tikzcd}$
fong-spivak-invitation_DIS_2018	329	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-329_292_334_1761_1058.jpg	$\begin{tikzcd} A' \arrow[rr, "g"] \arrow[dd, equal] \arrow[drr, dotted] & & A \arrow[dl, equal] \arrow[dl, equal] \arrow[d, equal] & \\ & A' \arrow[r, "g"] \arrow[d, "f'"'] & A \arrow[d, "f"] & \\ A' \arrow[r, "g"] \arrow[dr, "f'"'] \arrow[drr, dotted] & A \arrow[r, "f"] \arrow[d, "f"] & B \\ & B' \arrow[r, "h"'] & B \end{tikzcd}$	$\begin{tikzcd} A' \arrow[rr, "g"] \arrow[dd, equal] \arrow[drr, dotted] & & A \arrow[dl, equal] \arrow[dl, equal] \arrow[d, equal] & \\ & A' \arrow[r, "g"] \arrow[d, "f'"'] & A \arrow[d, "f"] & \\ A' \arrow[r, "g"] \arrow[dr, "f'"'] \arrow[drr, dotted] & A \arrow[r, "f"] \arrow[d, "f"] & B \\ & B' \arrow[r, "h"'] & B \end{tikzcd}$	$\begin{tikzcd} A' \arrow[rr, "g"] \arrow[dd, equal] \arrow[drr, dotted] & & A \arrow[dl, equal] \arrow[dl, equal] \arrow[d, equal] & \\ & A' \arrow[r, "g"] \arrow[d, "f'"'] & A \arrow[d, "f"] & \\ A' \arrow[r, "g"] \arrow[dr, "f'"'] \arrow[drr, dotted] & A \arrow[r, "f"] \arrow[d, "f"] & B \\ & B' \arrow[r, "h"'] & B \end{tikzcd}$

fong-spivak-invitation_DI_330	330	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-330_174_458_558_712.jpg			
fong-spivak-invitation_DI_330	330	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-330_344_560_1333_680.jpg	$\begin{tikzcd} (0,0) & (0,1) \arrow[l] & (0,2) \arrow[l] & (0,3) \arrow[l] \\ (1,0) \arrow[u] & (1,1) \arrow[l] \arrow[u] & (1,2) \arrow[l] \arrow[u] & \\ (2,0) \arrow[u] & (1,1) \arrow[l] \arrow[u] & & \\ (3,0) \arrow[u] & & & \end{tikzcd}$	$\begin{tikzcd} (0,0) & (0,1) \arrow[l] & (0,2) \arrow[l] & (0,3) \arrow[l] \\ (1,0) \arrow[u] & (1,1) \arrow[l] \arrow[u] & (1,2) \arrow[l] \arrow[u] & \\ (2,0) \arrow[u] & (1,1) \arrow[l] \arrow[u] & & \\ (3,0) \arrow[u] & & & \end{tikzcd}$	$\begin{tikzcd} (0,0) & (0,1) \arrow[l] & (0,2) \arrow[l] & (0,3) \arrow[l] \\ (1,0) \arrow[u] & (1,1) \arrow[l] \arrow[u] & (1,2) \arrow[l] \arrow[u] & \\ (2,0) \arrow[u] & (1,1) \arrow[l] \arrow[u] & & \\ (3,0) \arrow[u] & & & \end{tikzcd}$
fong-spivak-invitation_DI_333	333	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-333_360_322_300_776.jpg	$\begin{tikzcd} A \arrow[dr, bend right, "U_1"'] & & B \arrow[ll, bend right, "U_3"'] \arrow[dl, bend left, "U_4"] \\ & C \arrow[ur, "U_5"] & \\ & & D \arrow[ul, bend left, "U_2"] \end{tikzcd}$	$\begin{tikzcd} A \arrow[dr, bend right, "U_1"'] & & B \arrow[ll, bend right, "U_3"'] \arrow[dl, bend left, "U_4"] \\ & C \arrow[ur, "U_5"] & \\ & & D \arrow[ul, bend left, "U_2"] \end{tikzcd}$	$\begin{tikzcd} A \arrow[dr, bend right, "U_1"'] & & B \arrow[ll, bend right, "U_3"'] \arrow[dl, bend left, "U_4"] \\ & C \arrow[ur, "U_5"] & \\ & & D \arrow[ul, bend left, "U_2"] \end{tikzcd}$
fong-spivak-invitation_DI_333	333	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-333_398_690_1176_592.jpg	$X := \{a_2, a_1, b_3, b_2, b_1, c_1, e_2, e_1\}$, f, $Y := \{a, b, c, d, e\}$	$X := \{a_2, a_1, b_3, b_2, b_1, c_1, e_2, e_1\}$, f, $Y := \{a, b, c, d, e\}$	$X := \{a_2, a_1, b_3, b_2, b_1, c_1, e_2, e_1\}$, f, $Y := \{a, b, c, d, e\}$
fong-spivak-invitation_DI_333	333	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-333_398_690_1817_592.jpg	$X := \{a_2, c_1, e_2, e_1, b_1, b_2, b_3, a_1\}$, f, $Y := \{a, b, c, d, e\}$	$X := \{a_2, c_1, e_2, e_1, b_1, b_2, b_3, a_1\}$, f, $Y := \{a, b, c, d, e\}$	$X := \{a_2, c_1, e_2, e_1, b_1, b_2, b_3, a_1\}$, f, $Y := \{a, b, c, d, e\}$
fong-spivak-invitation_DI_334	334	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-334_364_1196_444_372.jpg	g_1 g_2 g_3 g_4 g_5 g_6	g_1 g_2 g_3 g_4 g_5 g_6	g_1 g_2 g_3 g_4 g_5 g_6
fong-spivak-invitation_DI_334	334	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-334_152_1128_1100_376.jpg	(a_1,b_1,c_1) (a_1,b_2,c_1) (a_1,b_3,c_1) (a_2,b_1,c_1) (a_2,b_2,c_1) (a_2,b_3,c_1) (a_1,c_1) (a_2,c_1)	(a_1,b_1,c_1) (a_1,b_2,c_1) (a_1,b_3,c_1) (a_2,b_1,c_1) (a_2,b_2,c_1) (a_2,b_3,c_1) (a_1,c_1) (a_2,c_1)	(a_1,b_1,c_1) (a_1,b_2,c_1) (a_1,b_3,c_1) (a_2,b_1,c_1) (a_2,b_2,c_1) (a_2,b_3,c_1) (a_1,c_1) (a_2,c_1)

fong-spivak-invitation_DIS_0448	334	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-334_466_452_1499_464.jpg			
fong-spivak-invitation_DIS_0448	334	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-334_424_228_1541_1241.jpg			
fong-spivak-invitation_DIS_0448	335	— *(dup)*	05b3e583-fc72-4ff5-9914-6f882b9df5b5-335_230_1118_1721_378.jpg