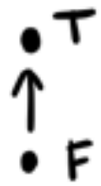
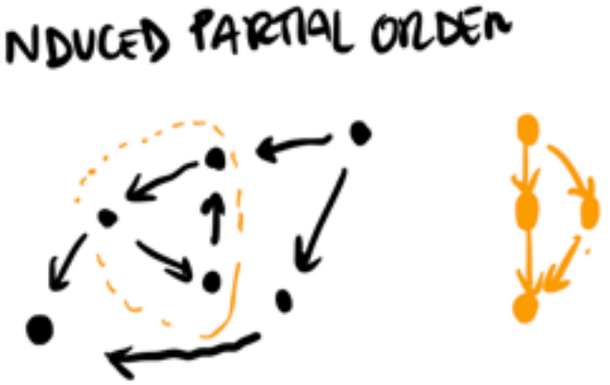
A PREORDER

BOOL

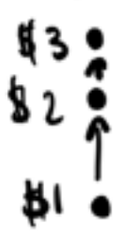


THE OPPOSITE OF A PRE-ORDER

INDUCED PARTIAL ORDER

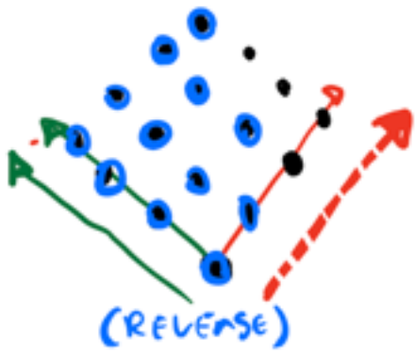


USD

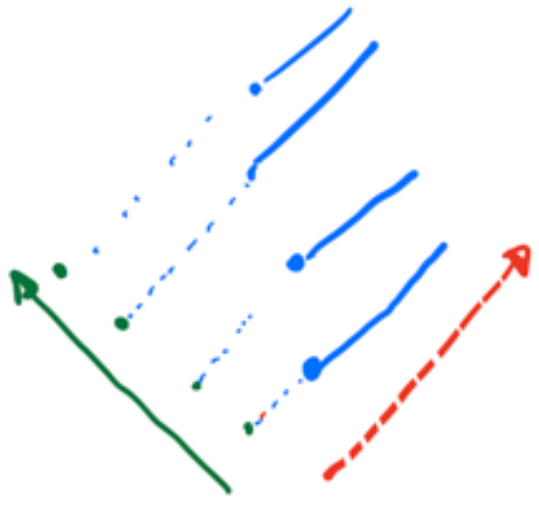


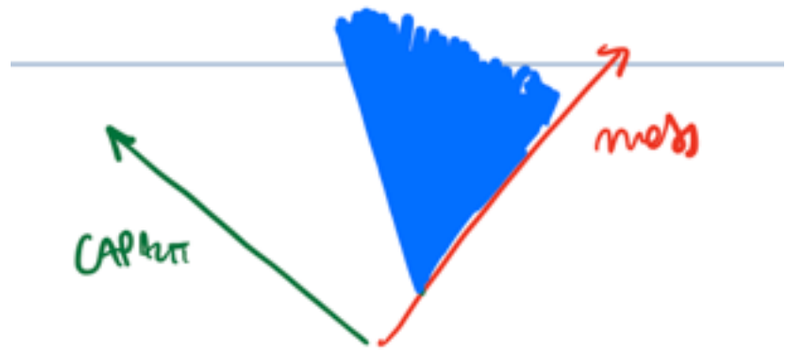
USD⁻

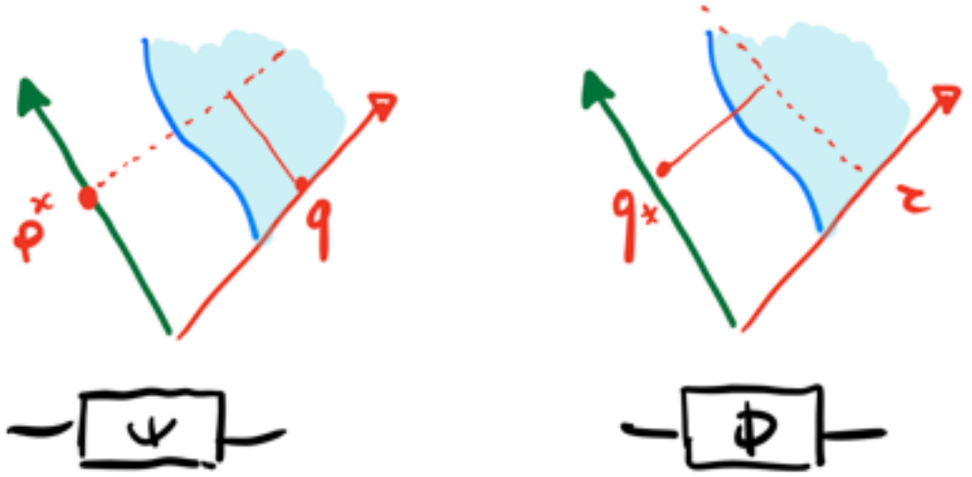
DISCRETE - DISCRETE

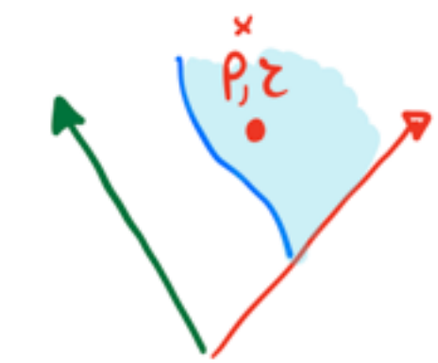


DISCRETE - CONTINUOUS

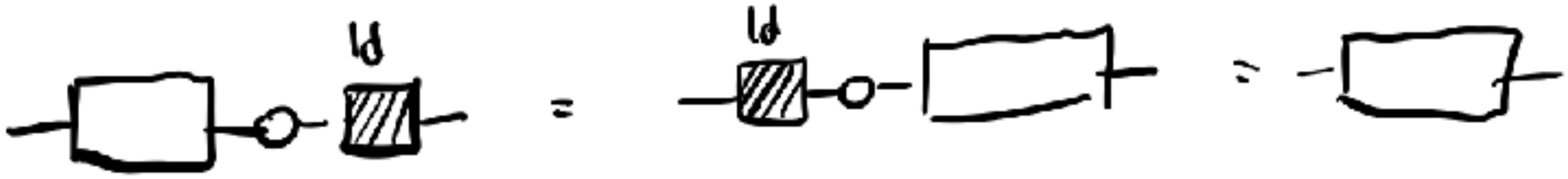





p*
q
Ψ
q*
z
Φ


ρ, z

Ψ
Φ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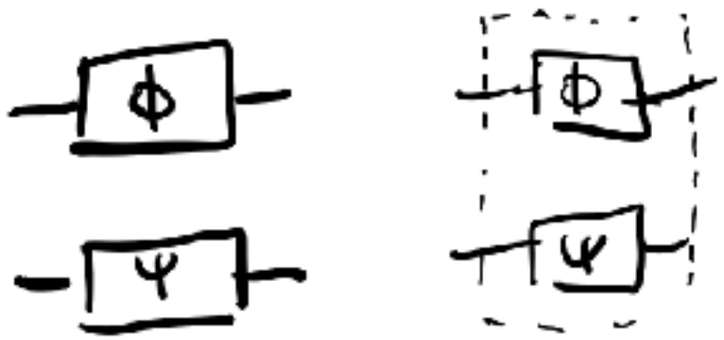
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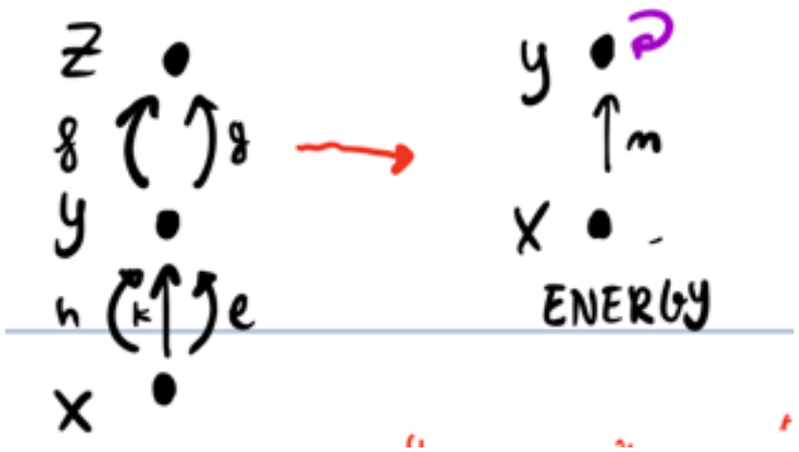
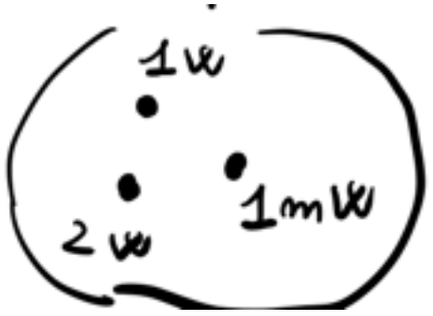
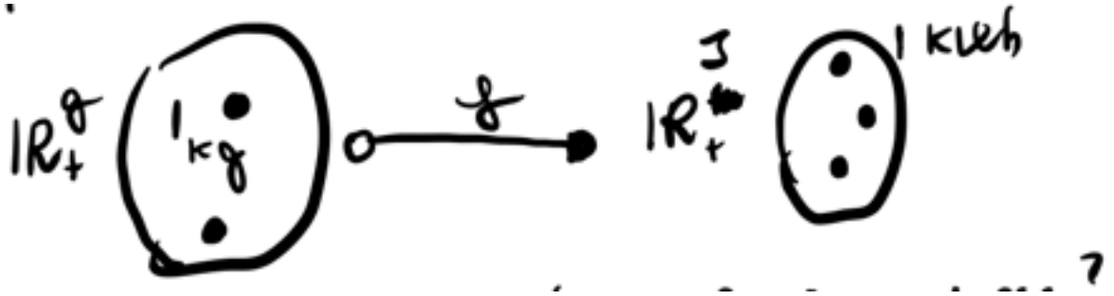
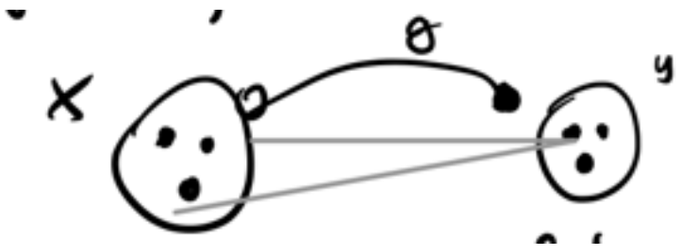
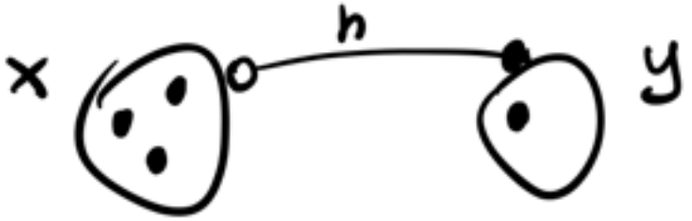

Z
g
g
y
n
k
e
X
y
m
X
ENERGY

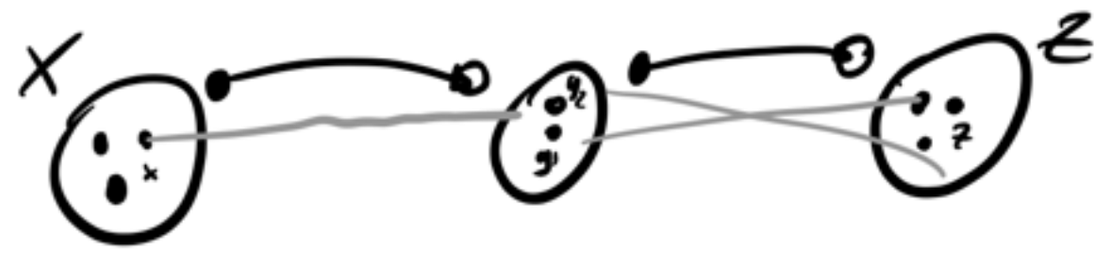

1 w
1 mw
2 w

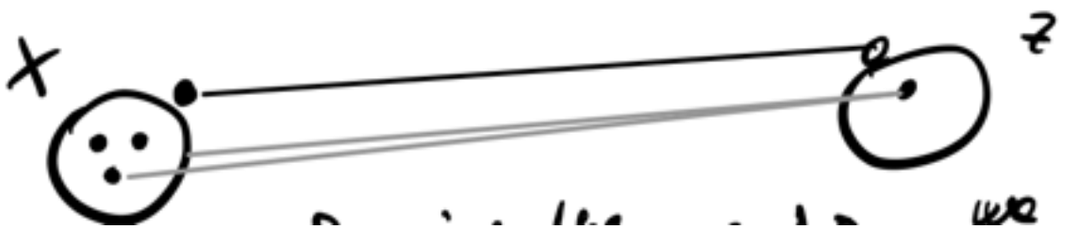

1 kg
1 kWh

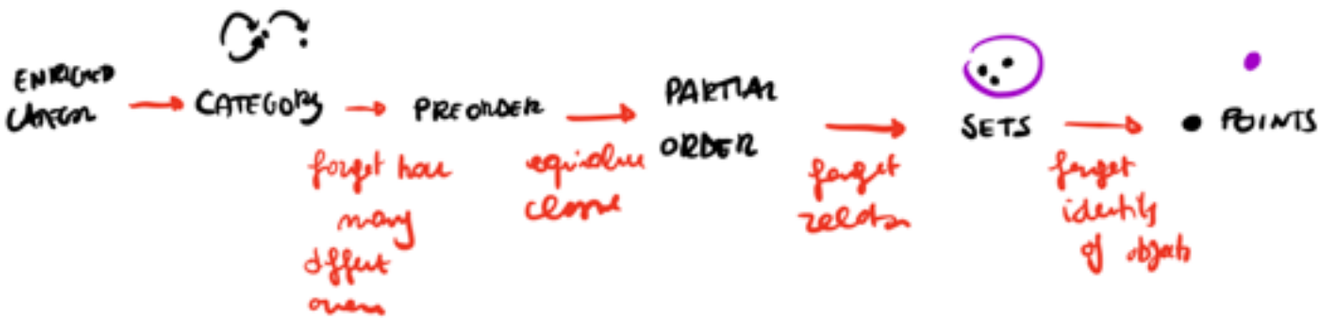
f
X
Y

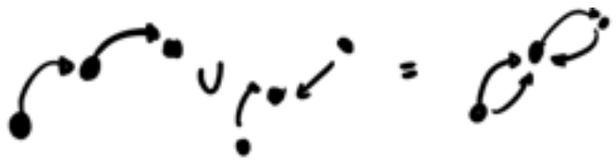

g
X
Y

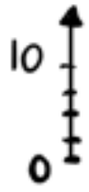

h
X
Y


X
Z


X
Z


ENRICHED
CATEGORY
CATEGORY
forget how many diffent ones
PREORDER
equivalence classes
PARTIAL ORDER
forget relation
SETS
forget identity of objects
POINTS




10
0

y

representing resources

points | sets | posets | categories

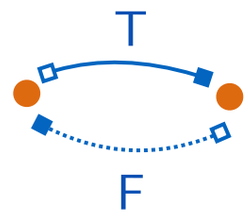
representing designs

points (booleans)

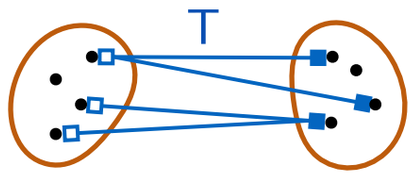
sets (subsets)

posets (upper sets)

categories

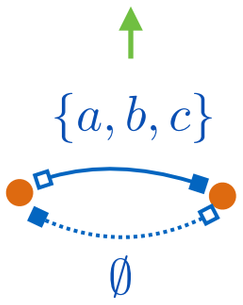


"preorders"
"boolean-enriched categories"

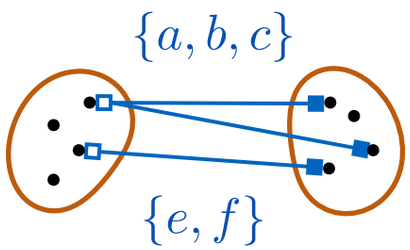


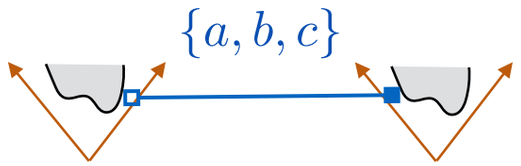
aka "relations"

"DP"
"boolean-enriched profunctors"

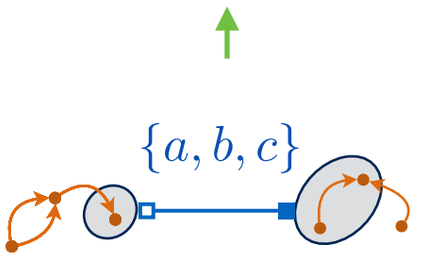


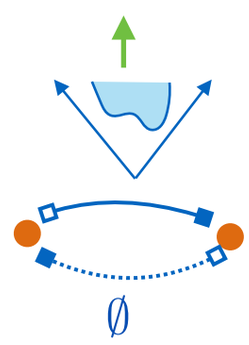
"a single category"



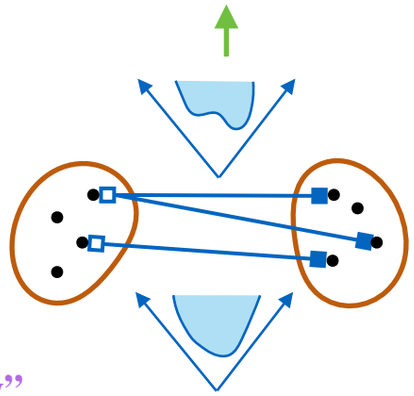


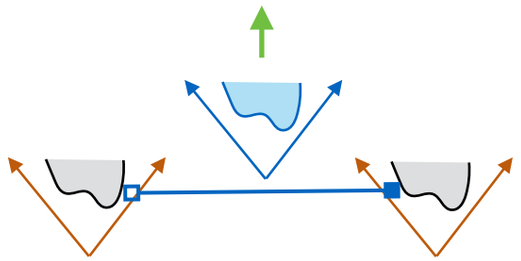
"DPI"
"set-enriched profunctors"



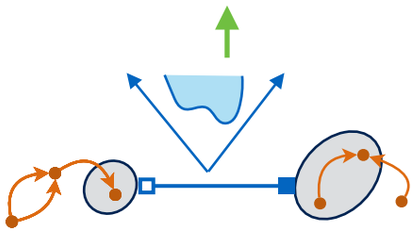


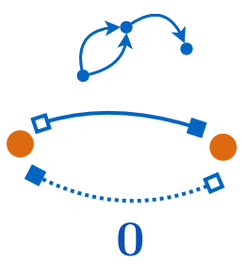
"a single locally posetal category"



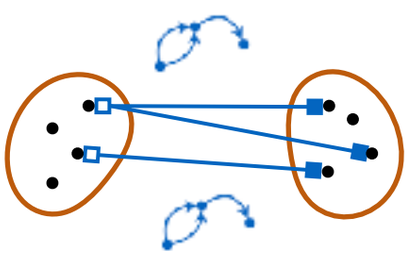


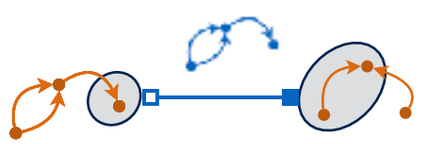
"DPI+"
"poset-enriched profunctors"





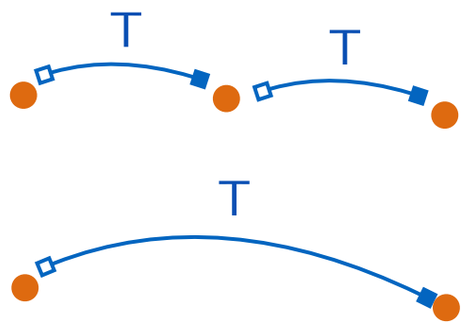
"a single 2-category"



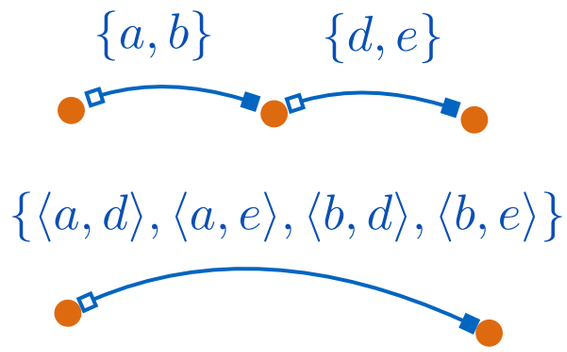


design composition

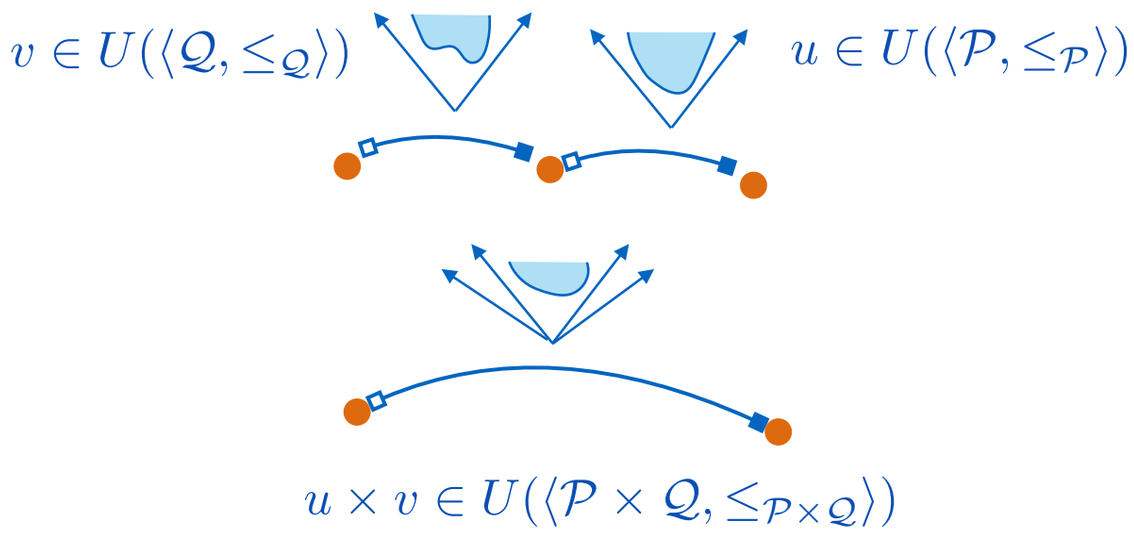
booleans



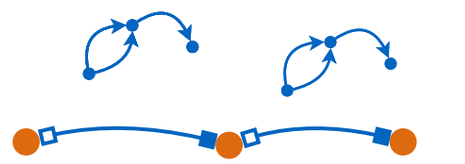
subsets



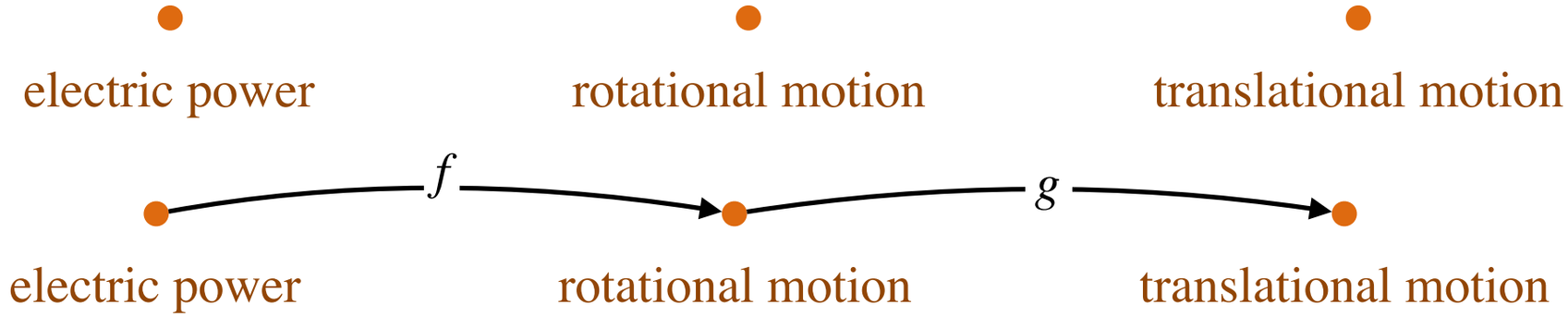
posets

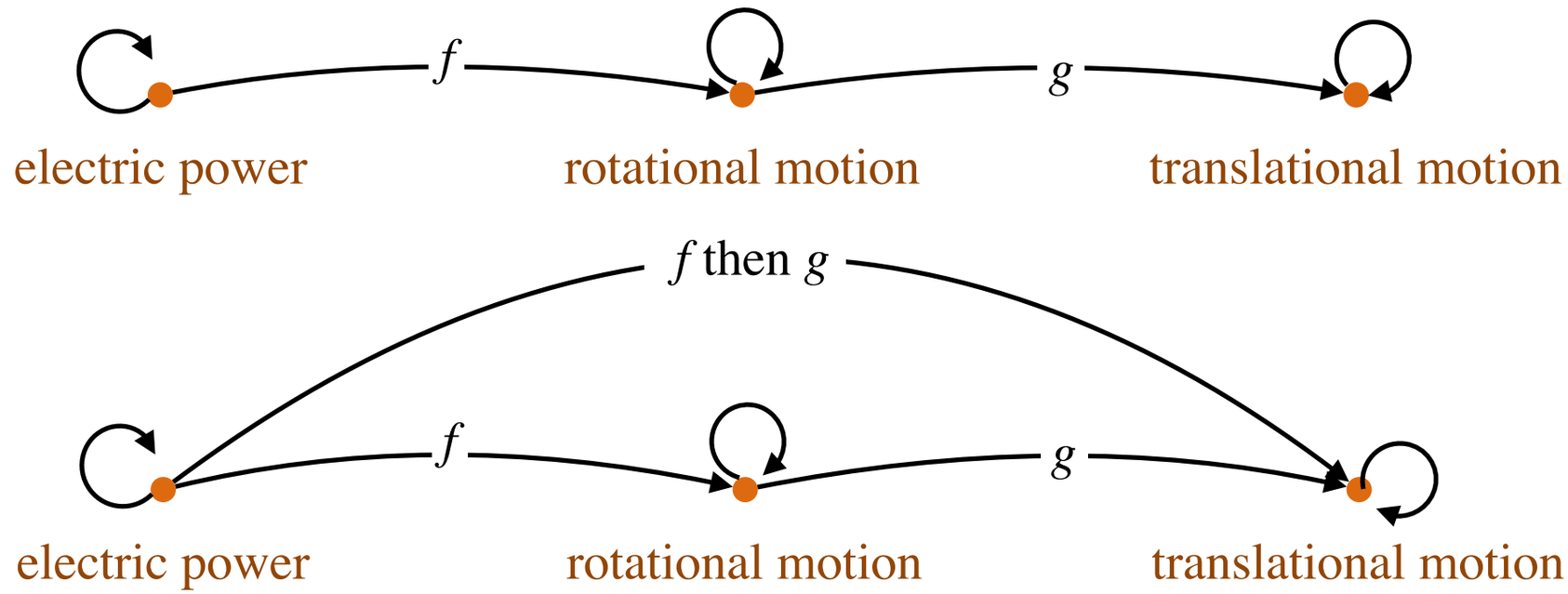


categories

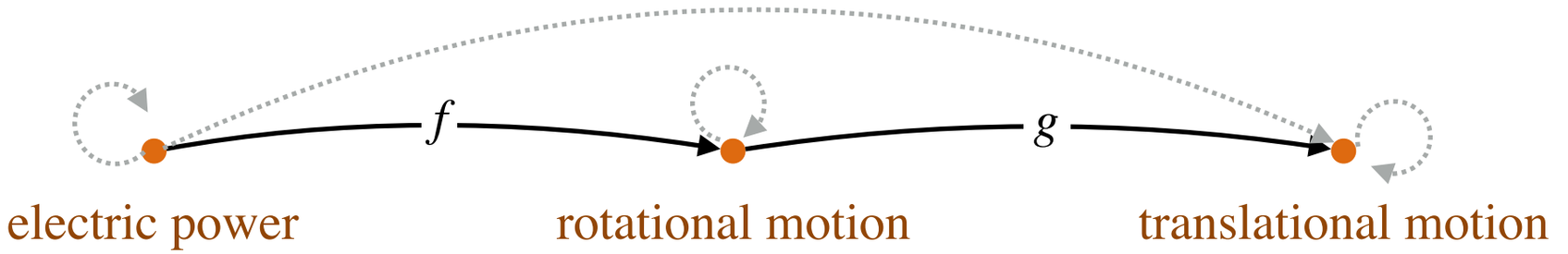


(category product)

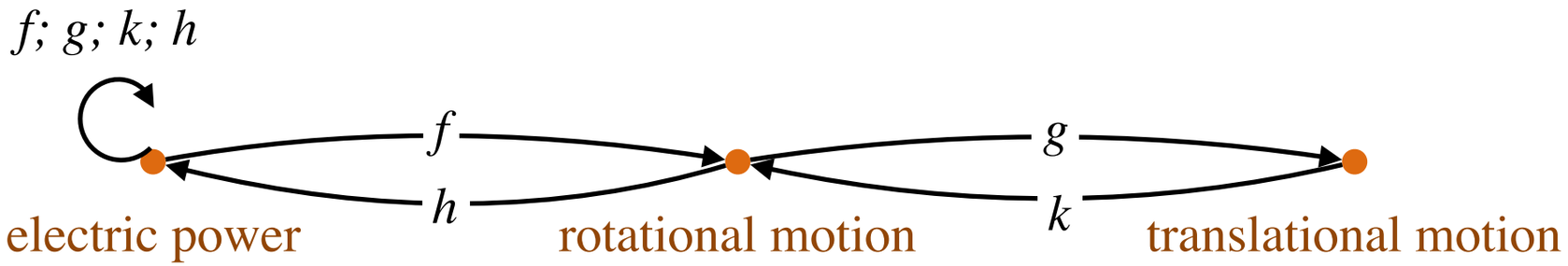

electric power
rotational motion
translational motion
f
g

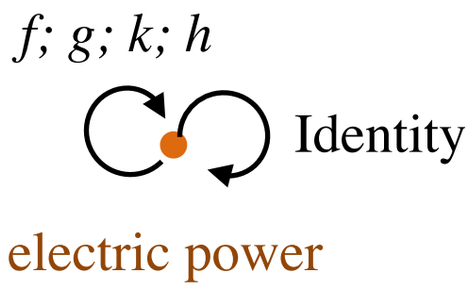

electric power
rotational motion
translational motion
f
g

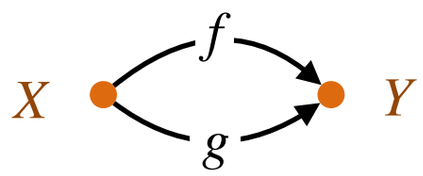
f then g
electric power
rotational motion
translational motion
f
g


electric power
rotational motion
translational motion
f
g

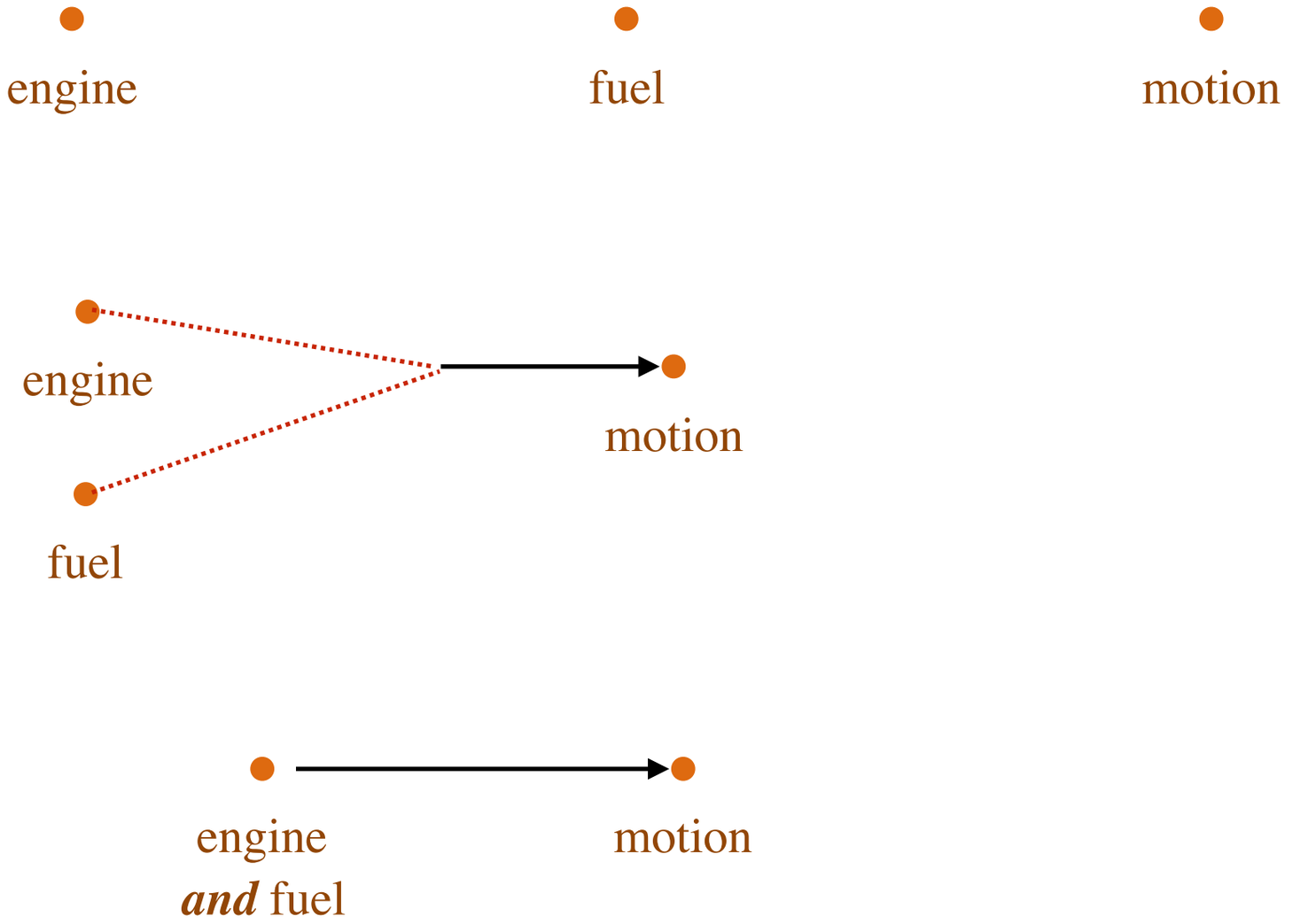
h
k
electric power
rotational motion
translational motion

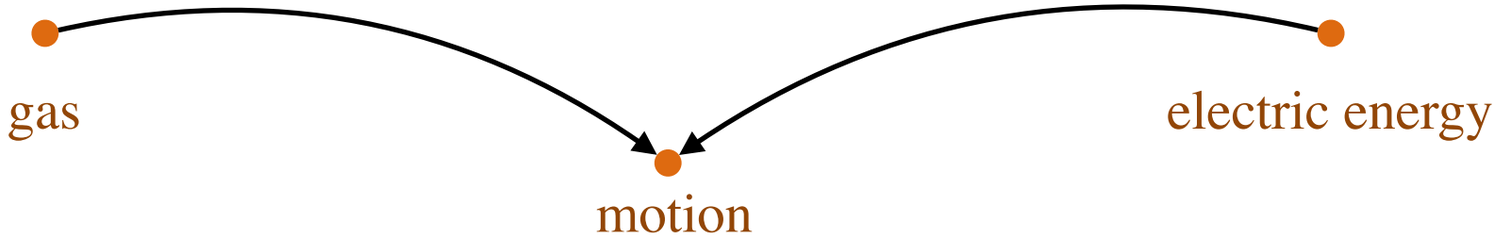

f; g; k; h
f
g
h
k
electric power
rotational motion
translational motion

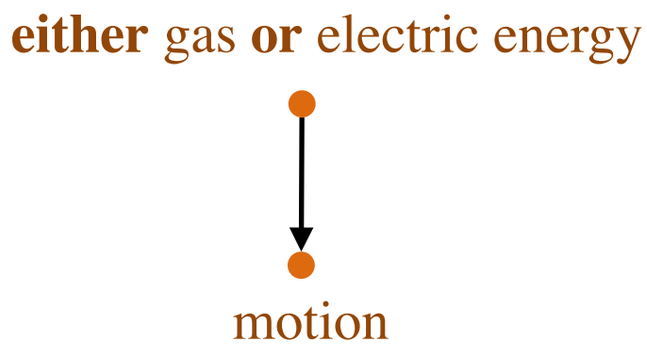

f; g; k; h
Identity
electric power

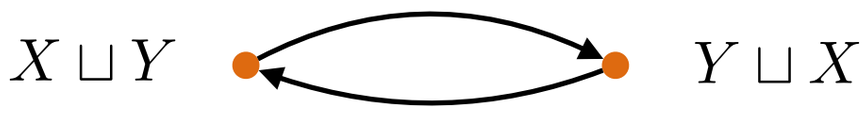

X
f
g
Y

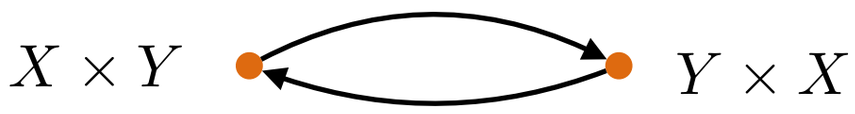
electric
power
heat


engine
fuel
motion
engine
motion
fuel
engine
and fuel
motion

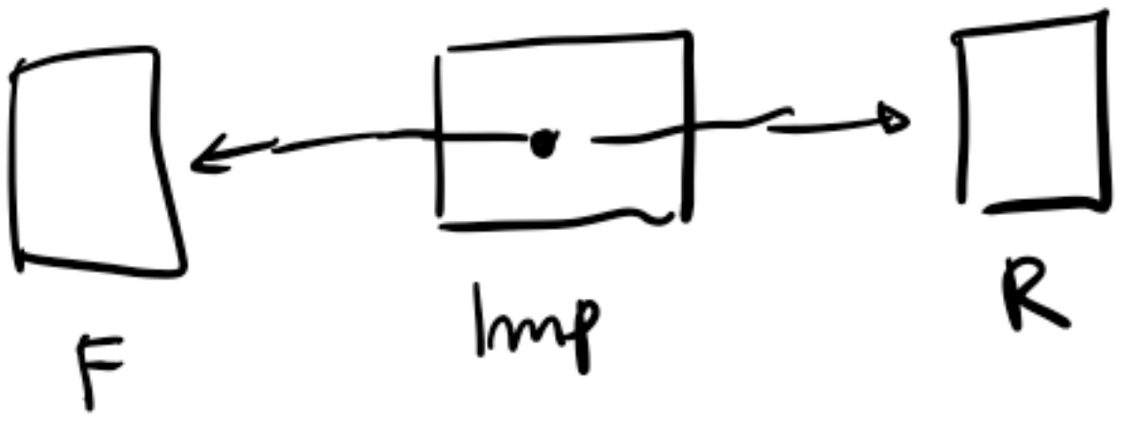

gas
electric energy
motion


either gas or electric energy
motion


$X \sqcup Y$
$Y \sqcup X$

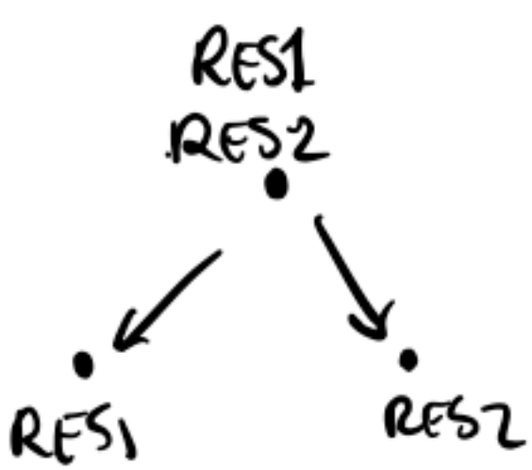

$X \times Y$
$Y \times X$

F-I-R



CARTESIAN - PRODUCT

RESOURCE PRODUCT

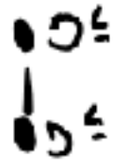


DISJOINT- UNION

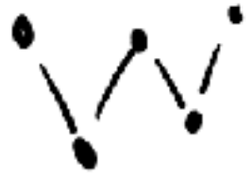
DISJOINT-UNION-SAME

SINGLETON

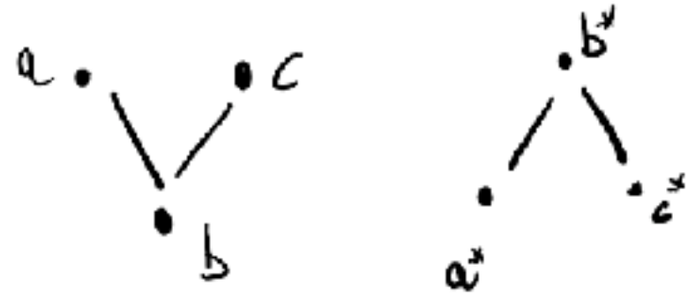
BOOLEAN



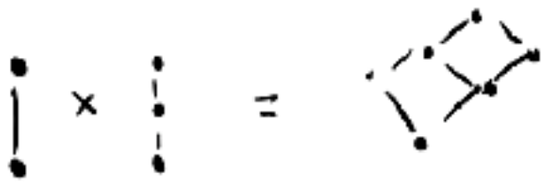
HASSE



OPPOSITE



POSET PRODUCT



POSET COPRODUCT