

Math examples

Example 1: (EQUATION)

$$\mathbf{P} = \lim_{\Delta v \rightarrow 0} \varepsilon \left[\frac{1}{\Delta v} \sum_{i=1}^{N_e \Delta v} d\mathbf{p}_i \right] = N_e d\mathbf{p}_{av} = N_e Q l_{av} \quad (1)$$

Example 2: (EQUATION*)

$$\mathbf{P} = \lim_{\Delta v \rightarrow 0} \left[\frac{1}{\Delta v} \sum_{i=1}^{N_e \Delta v} d\mathbf{p}_i \right] = N_e d\mathbf{p}_{av} = N_e Q l_{av}, :: ?!$$

Example 3: (EQNARRAY)

$$\begin{aligned} \mathbf{P} &= ab + bc \quad \lim_{\Delta v \rightarrow 0} \left[\frac{1}{\Delta v} \sum_{i=1}^{N_e \Delta v} d\mathbf{p}_i \right] = N_e d\mathbf{p}_{av} = N_e Q l_{av} \\ \mathbf{P} &= ab + bc \quad \lim_{\Delta v \rightarrow 0} \left[\frac{1}{\Delta v} \sum_{i=1}^{N_e \Delta v} d\mathbf{p}_i \right] = N_e d\mathbf{p}_{av} = N_e Q l_{av} \end{aligned} \quad (2)$$

$$= ab + bc \quad \lim_{\Delta v \rightarrow 0} \left[\frac{1}{\Delta v} \sum_{i=1}^{N_e \Delta v} d\mathbf{p}_i \right] = N_e d\mathbf{p}_{av} = N_e Q l_{av} \quad (3)$$

Example 4: (EQNARRAY*)

$$\begin{aligned} \mathbf{P} &= \lim_{\Delta v \rightarrow 0} \left[\frac{1}{\Delta v} \sum_{i=1}^{N_e \Delta v} d\mathbf{p}_i \right] = N_e d\mathbf{p}_{av} = N_e Q l_{av} \\ \mathbf{P} &= \lim_{\Delta v \rightarrow 0} \left[\frac{1}{\Delta v} \sum_{i=1}^{N_e \Delta v} d\mathbf{p}_i \right] = N_e d\mathbf{p}_{av} = N_e Q l_{av} \\ &= \lim_{\Delta v \rightarrow 0} \left[\frac{1}{\Delta v} \sum_{i=1}^{N_e \Delta v} d\mathbf{p}_i \right] = N_e d\mathbf{p}_{av} = N_e Q l_{av} \end{aligned}$$

Example 5: (ALIGN)

$$z = x + y \qquad \qquad \qquad z = x + y \qquad \qquad \qquad (4)$$

$$= z + y \qquad \qquad \qquad x = z + y$$

$$a = b + c \qquad \qquad \qquad a = b + c \qquad \qquad \qquad (5)$$

$$= z + y \qquad \qquad \qquad x = z + y$$

$$b = b + c \qquad \qquad \qquad a = b + c \qquad \qquad \qquad (6)$$

$$c = b + c \qquad \qquad \qquad a = b + c \qquad \qquad \qquad (7)$$

$$d = b + c \qquad \qquad \qquad a = b + c \S \qquad \qquad \qquad (8)$$

$$e = b + c \qquad \qquad \qquad a = b + c \qquad \qquad \qquad (9)$$

Example 6: (ALIGN*)

$$z = x + y \qquad \qquad \qquad z = x + y$$

$$= z + y \qquad \qquad \qquad x = z + y$$

$$a = b + c \qquad \qquad \qquad a = b + c$$

Example 7: (GATHER)

$$\begin{aligned} \mathbf{P} &= \lim_{\Delta v \rightarrow 0} \left[\frac{1}{\Delta v} \sum_{i=1}^{N_e \Delta v} d\mathbf{p}_i \right] = N_e d\mathbf{p}_{\text{av}} = N_e Q l_{\text{av}} \\ \mathbf{P} &= \lim_{\Delta v \rightarrow 0} \left[\frac{1}{\Delta v} \sum_{i=1}^{N_e \Delta v} d\mathbf{p}_i \right] = N_e d\mathbf{p}_{\text{av}} = N_e Q l_{\text{av}} \end{aligned} \qquad (10)$$

Example 8: (GATHER*)

$$\begin{aligned} \mathbf{P} &= \lim_{\Delta v \rightarrow 0} \left[\frac{1}{\Delta v} \sum_{i=1}^{N_e \Delta v} d\mathbf{p}_i \right] = N_e d\mathbf{p}_{\text{av}} = N_e Q l_{\text{av}} \\ \mathbf{P} &= \lim_{\Delta v \rightarrow 0} \left[\frac{1}{\Delta v} \sum_{i=1}^{N_e \Delta v} d\mathbf{p}_i \right] = N_e d\mathbf{p}_{\text{av}} = N_e Q l_{\text{av}} \end{aligned}$$

Example 9: (ALIGNAT)

$$\begin{aligned}
x &= y_1 - y_2 + y_3 - y_5 + y_8 - \dots && \text{by Axiom 1.} \\
&= y' \circ y^* && \text{by Axiom 2.} \\
&= y(0)y' && \text{by Axiom 3.}
\end{aligned} \tag{11}$$

Example 10: (ALIGNAT*)

$$\begin{aligned}
x &= y_1 - y_2 + y_3 - y_5 + y_8 - \dots && \text{by Axiom 1.} \\
&= y' \circ y^* && \text{by Axiom 2.} \\
&= y(0)y' && \text{by Axiom 3.}
\end{aligned}$$

Example 11: (ALIGNED inside EQUATION)

$$\left. \begin{aligned} B' &= -\partial \times E, \\ &= -\partial \times Z, \\ E' &= \partial \times B - 4\pi j, \end{aligned} \right\} \quad \text{Maxwell's equations} \tag{12}$$

Example 12: (ALIGNED inside EQUATION*)

$$\left. \begin{aligned} B' &= -\partial \times E, \\ &= -\partial \times Z, \\ E' &= \partial \times B - 4\pi j, \end{aligned} \right\} \quad \text{Maxwell's equations}$$

Example 13: (SUBARRAY inside EQUATION)

$$\sum_{\substack{i \in \Lambda \\ 0 < j < n}} P(i, j) = \partial \times B - 4\pi j, \tag{13}$$

Example 14: (SUBARRAY inside EQUATION)

$$\sum_{\substack{i \in \Lambda \\ 0 < j < n}} P(i, j) = \partial \times B - 4\pi j, \tag{14}$$

Example 15: (FLALIGN)

$a_{11} = b_{11}$	$a_{12} = b_{12}$
$a_{21} = b_{21}$	$a_{22} = b_{22} + c_{22} \quad (15)$
$\quad = b_{21}$	$a_{22} = b_{22} + c_{22} \quad (16)$

Example 16: (FLALIGN*)

$a_{11} = b_{11}$	$a_{12} = b_{12}$
$a_{21} = b_{21}$	$a_{22} = b_{22} + c_{22}$
$\quad = b_{21}$	$a_{22} = b_{22} + c_{22}$

Example 17: (MULTILINE)

$a + b + c + d + e + f$	
	$a + b + c + d + e + f$
	$a + b + c + d + e + f$
	$+ i + j + k + l + m + n \quad (17)$

Example 18: (MULTILINE*)

$a + b + c + d + e + f$	
	$a + b + c + d + e + f$
	$a + b + c + d + e + f$
	$+ i + j + k + l + m + n$

Example 19: (CASES within EQUATION)

$\left\{ \begin{array}{ll} x = 2 & x - 2 \\ x = 2 & x - 2 \\ & x - 2 \end{array} \right.$	(18)
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Example 20: (CASES within EQUATION*)

$$\left\{ \begin{array}{ll} x = 2 & x - 2 \\ x = 2 & x - 2 \\ & x - 2 \end{array} \right.$$

Example 21: (bmatrix within EQUATION)

$$\alpha + \gamma_2 = \begin{bmatrix} 1 & 2 - 3 & a + b \\ 1 & 2 - 3 & c + d \\ 1 & 2 - 3 & c + d \end{bmatrix} \quad (19)$$

Example 22:(BMatrix within EQUATION)

$$\alpha + \gamma_2 = \left\{ \begin{array}{lll} 1 & 2 - 3 & a + b \\ 1 & 2 - 3 & c + d \\ & 2 - 3 & c + d \end{array} \right\}$$

Example 23: (vmatrix within EQUATION)

$$\alpha + \gamma_2 = \begin{vmatrix} 1 & 2 - 3 & a + b \\ 1 & 2 - 3 & c + d \\ 1 & 2 - 3 & c + d \end{vmatrix}$$

Example 24: (Vmatrix within EQUATION)

$$\alpha + \gamma_2 = \left\| \begin{array}{lll} 1 & 2 - 3 & a + b \\ 1 & 2 - 3 & c + d \\ 1 & 2 - 3 & c + d \end{array} \right\|$$

Example 25: (pmatrix within EQUATION)

$$\alpha + \gamma_2 = \begin{pmatrix} 1 & 2 - 3 & a + b \\ 1 & 2 - 3 & c + d \\ 1 & 2 - 3 & c + d \end{pmatrix}$$

Example 26: (SUBEQUATIONS with EQNARRAY)

$$\mathbf{P} = \lim_{\Delta v \rightarrow 0} \left[\frac{1}{\Delta v} \sum_{i=1}^{N_e \Delta v} d\mathbf{p}_i \right] = N_e d\mathbf{p}_{\text{av}} = N_e Q l_{\text{av}}$$

$$\mathbf{P} = \lim_{\Delta v \rightarrow 0} \left[\frac{1}{\Delta v} \sum_{i=1}^{N_e \Delta v} d\mathbf{p}_i \right] = N_e d\mathbf{p}_{\text{av}} = N_e Q l_{\text{av}} \quad (20a)$$

$$\mathbf{P} = \lim_{\Delta v \rightarrow 0} \left[\frac{1}{\Delta v} \sum_{i=1}^{N_e \Delta v} d\mathbf{p}_i \right] = N_e d\mathbf{p}_{\text{av}} = N_e Q l_{\text{av}} \quad (20b)$$

Example 27: (SPLIT within EQUATION)

$$x = x$$

$$x + y = 2 \quad (21)$$

$$= \infty$$

Example 28:

$$\text{int with side limits - msup: } \int^A A + B + C + \dots + Z$$

Example 29:

$$\text{int with side limits - msub: } \int_A A, B, C, \dots, Z$$

Example 30:

$$\text{int with side limits - msubsup: } \int_A^B A + B + C + \dots + Z$$

Example 31:

$$\text{sum with limits - munder: } \sum_A A, B, C, \dots, Z$$

Example 32:

$$\text{sum with limits - mover: } \sum^b$$

Example 33:

$$\text{sum with limits - munderover: } \int_A^b$$

Example 34:

$$\text{underline: } \underline{b + c = d}$$

Example 35:

$$\text{underline: } \underline{b + c + z = y}$$

Example 36:

$$\text{underbrace: } \underbrace{a + b = c^2 + y_2(a^2)^2}$$

Example 37:

$$\text{underrightarrow - use accentunder=false attribute: } \underrightarrow{a + b_c + y}$$

Example 38:

$$\text{underleftarrow - use accentunder=false attribute: } \underleftarrow{a + b_c + y}$$

Example 39:

$$\text{underleftrightharpoonup - use accentunder=false attribute: } \underleftrightharpoonup{a + b_c + y}$$

Example 41:

$$\text{overline - use accent=true and entity \‾; } \overline{(a + b = c)}$$

Example 42:

$$\text{overbrace - use accent=true and entity \⏞; } \overbrace{a + b + c}$$

Example 43:

$$\text{overrightarrow - use accent=true and entity \&c.rarrab;; } \overrightarrow{a + b + c} \quad \vec{a}$$

Example 44:

$$\text{overleftarrow - use accent=true and entity \&c.larrab;; } \overleftarrow{a + b + c}$$

Example 45:

$$\text{overleftrightharpoonup - use accent=true and entity \&c.lrrab;; } \overleftrightharpoonup{a + b + c}$$

Example 47: (ARRAY within EQUATION)

$$\sum_{i=1}^1 \begin{array}{c} 2-3 \\ a+b \\ c+d \end{array} = 1 \quad \begin{array}{c} 2-3 \\ c+d \end{array} \quad (22)$$

Example 48: (SPLIT within EQUATION*)

$$\begin{array}{c} x = x \\ x + y = 2 \\ = \infty \end{array}$$

Example 49:

$$\begin{array}{r} 11 \quad \text{(carried)} \\ 11101 \\ + \quad \underline{10111} \\ \hline 01011 \end{array}$$

Example 50:

$$= 2 \cos(2 \cdot \underbrace{327}_{\substack{\text{average} \\ \text{frequency}}} \pi t) \cos(\underbrace{130}_{\substack{\text{beats per} \\ \text{second}}} \pi t)$$

Example for overset option

$$L_s = \mu_1 h = \mu_1 = \frac{BW}{\omega_o \sqrt{\mu_2 \epsilon_2}} = \frac{\mu_1}{\sqrt{\mu_2 \epsilon_2}} \quad (23)$$

$$\left(\frac{BW}{\omega_o}\right) \overbrace{a \pm b}^{\quad} B \left(\frac{BW}{\omega_o}\right) \overset{a}{\underset{b}{=}} B \left(\frac{BW}{\omega_o}\right) \overbrace{\mu_1 = \mu_2}^{\quad} B \left(\frac{BW}{\omega_o}\right) \overbrace{\mu_1 = \mu_2}^{\quad} B \left(\frac{BW}{\omega_o}\right) \quad (24)$$

$$\begin{array}{l}
A \xleftarrow[\text{under}]{\text{this way}} B \\
B \xrightarrow[\text{or that way}]{} C \\
a \xleftrightarrow[\text{under}]{\text{over}} b \\
A \xleftrightarrow[\text{under}]{\text{over}} B \\
B \xleftrightarrow[\text{under}]{\text{over}} C \\
C \xleftrightarrow[\text{under}]{\text{over}} D \\
E \xleftrightarrow[\text{under}]{\text{over}} F \\
F \xleftrightarrow[\text{under}]{\text{over}} G \\
H \xleftrightarrow[\text{under}]{\text{over}} I \\
I \xleftrightarrow[\text{under}]{\text{over}} J \\
J \xleftrightarrow[\text{under}]{\text{over}} K \\
K \xleftrightarrow[\text{under}]{\text{over}} L \\
L \xleftrightarrow[\text{under}]{\text{over}} M \\
M \xleftrightarrow[\text{under}]{\text{over}} N
\end{array} \tag{25}$$

Subordinate equation numbering Maxwell’s equations:

$$B' = -\nabla \times E, \tag{26a}$$

$$E' = \nabla \times B - 4\pi j, \tag{26b}$$

$$A = \left(\begin{array}{c} \int_t XXX \\ YYY \dots \end{array} \right) \tag{27}$$

$$\boxed{x^2+y^2=z^2} \tag{28}$$

$$\lim_{a\rightarrow\infty}\frac{1}{a} \tag{29}$$

$$\lim_{a\rightarrow\infty}\frac{1}{a}\tag{30}$$

$$\int_a^b x^2\mathrm{d}x+\int_a^b x^2\mathrm{d}x+\lim_{\substack{a\rightarrow 0\\>}}\frac{1}{a}\tag{31}$$

$$\sum\nolimits^{\prime}C_n=\sum\nolimits_{n=1}^{\prime}C_n=\sum\nolimits_{n=1}^{\prime}C_n=\sum\nolimits_a^b\sum\nolimits_c^d=\sum\nolimits_{n=1}^{\prime}C_n\tag{32}$$

$$\prod_{\substack{1\leq i\leq n\\1\leq j\leq m}}M_{i,j}\tag{33}$$

$$x=a_0+\frac{1}{a_1+\frac{1}{a_2+\frac{1}{a_3+a_4}}}\tag{34}$$

$$x=a_0+\frac{1}{a_1+\frac{1}{a_2+\frac{1}{a_3+a_4}}}\tag{35}$$

$$A\stackrel{!}{=}B;A\stackrel{!}{=}B\tag{36}$$

$$\lim_{x\rightarrow 0}\frac{e^x-1}{2x}\stackrel{\left[\frac{0}{0}\right]}{=} \lim_{x\rightarrow 0}\frac{e^x}{2}=\frac{1}{2}\tag{37}$$

$$z=\overbrace{\underbrace{x}_{\text{real}}+i\,\underbrace{y}_{\text{imaginary}}}^{\text{complex number}}\tag{38}$$

$$y=a+f(\underbrace{bx}_{\geq 0\text{ by assumption}})=a+f(\underbrace{bx}_{\geq 0\text{ by assumption}})\tag{39}$$

⟨I1:

acute: \acute{b} \acute{a}

⟨I2:

grave: \grave{b} \grave{a}

⟨I3:

ddot: \ddot{b} \ddot{a}

⟨I4:

tilde: \tilde{b} \tilde{a}

⟨I5:

bar: \bar{b} \bar{a}

⟨I6:

breve: \breve{b} \breve{a}

⟨I7:

hat: \hat{n} \hat{a}

⟨I8:

check: \check{b} \check{a}

⟨I9:

vec: \vec{b} \vec{b}

⟨I10:

widetilde: \widetilde{b} $\widetilde{a+b}$

⟨I11:

widehat: \widehat{b} $\widehat{a+b}$

⟨I12:

different flushbottom figure difficult fflash

⟨I13:

$C + \cdots + L$ example for cdots and lots $C + \dots + L$

⟨I16⟩ - calligraphic characters

$\mathcal{A} \mathcal{B} \mathcal{C} \mathcal{D} \mathcal{E} \mathcal{F} \mathcal{G} \mathcal{H} \mathcal{I} \mathcal{J} \mathcal{K} \mathcal{L} \mathcal{M}$

$\mathcal{N} \mathcal{O} \mathcal{P} \mathcal{Q} \mathcal{R} \mathcal{S} \mathcal{T} \mathcal{U} \mathcal{V} \mathcal{W} \mathcal{X} \mathcal{Y} \mathcal{Z}$

⟨I17⟩ - bold calligraphic charactes

A B C D E F G H I J K L M

N O P Q R S T U V W X Y Z

⟨I18:

Œ Æ Ć Ď ě Ğ Ħ Ĩ Ĵ Ķ Ł Ű

Ų Ɔ Ɔ Ɔ Ɔ Ɔ Ɔ Ɔ Ɔ Ɔ Ɔ Ɔ Ɔ

a b c d e f g h i j k l m

n o p q r s t u v w x y z

⟨I19:

Œ Æ Ć Ď ě Ğ Ħ Ĩ Ĵ Ķ Ł Ű

Ų Ɔ Ɔ Ɔ Ɔ Ɔ Ɔ Ɔ Ɔ Ɔ Ɔ Ɔ Ɔ

a b c d e f g h i j k l m

n o p q r s t u v w x y z

⟨I20:

A B C D E F G H I J K L M

N O P Q R S T U V W X Y Z

⟨I21:

A B C D E F G H I J K L M

N O P Q R S T U V W X Y Z

⟨I27:

$$\frac{\pi}{2}\left[\frac{1}{\Delta v}\sum_{i=1}^{N_e\Delta v}d\mathbf{p}_i\right]$$

⟨I28:

$$10^{\circ}\mathrm{C} \quad 10_{\circ}\mathrm{C} \quad f\circ g$$

⟨I29:

$$\sin x \qquad \arcsin x \qquad \sinh x \qquad \cos x \qquad \arccos x \qquad \cosh x \qquad \tan x$$

$$\arctan x \qquad \tanh x \qquad \cot x \qquad \coth x \qquad \sec x \qquad \csc x$$

⟨I30:

$$f(x) \qquad f'(x) \qquad f(1)$$

Example 48:

$$\overleftarrow{\frac{x^2+2xy+y^2}{a+c}} \quad \overrightarrow{\frac{x^2+2xy+y^2}{a+c}} \quad \overleftarrow{\frac{\text{maps to}}{x+y^2}} \quad \overrightarrow{\frac{\text{maps to}}{x+y^2}} \overleftarrow{\frac{\text{maps to}}{a+c}}$$

$$\frac{1}{2} \quad \frac{1}{2} \quad \binom{1}{2} \quad \binom{1}{2} \quad \sqrt{p(1-p)/n}$$

⟨I22:

A B C D E F G H I J K L M

N O P Q R S T U V W X Y Z

a b c d e f g h i j k l m

n o p q r s t u v w x y z

⟨I23⟩ Italic sanserif alphabet

A B C D E F G H I J K L M

N O P Q R S T U V W X Y Z

a b c d e f g h i j k l m

n o p q r s t u v w x y z

⟨I24⟩ bold sanserif alphabet

A B C D E F G H I J K L M

N O P Q R S T U V W X Y Z

a b c d e f g h i j k l m

n o p q r s t u v w x y z

⟨I25⟩ bold-italic sanserif alphabet

A B C D E F G H I J K L M

N O P Q R S T U V W X Y Z

a b c d e f g h i j k l m

n o p q r s t u v w x y z