Matricies

```
$
\begin{bmatrix}
x  & x\\
x  & x\\
\end{bmatrix}
$
```

$\rightarrow \begin{bmatrix} x & x \\ x & x \end{bmatrix}$

```
$
\begin{pmatrix}
x  & x\\
x  & x\\
\end{pmatrix}
$
```

$\rightarrow \begin{pmatrix} x & x \\ x & x \end{pmatrix}$

```
$
\begin{matrix}
x  & x\\
x  & x\\
\end{matrix}
$
```

$\rightarrow \begin{matrix} x & x \\ x & x \end{matrix}$

```
$\dots \\
\vdots \\
\ddots$
```

$\rightarrow \dots \\ \vdots \\ \ddots$

Subscript and Superscript

```
$
x_a \\
x^T \\
{}^{A}_{B}T \\
{}^{D}P
$
```

x_a
x^T
${}^{A}_{B}T$
${}^{D}P$

Equations

```
$$
\begin{align}
a & = b \\
b & = c
\end{align}
$$
```

$$\begin{aligned} a &= b \\ b &= c \end{aligned}$$

```
$$
\begin{equation}
E = F \cdot s
\end{equation}
$$
```

$$E = F \cdot s \tag{1}$$

(in line) `$ [expression] $`
(display) `$$ [expression] $$`

x y z Rotations

$$R_x(\gamma) = \begin{bmatrix} 1 & 0 & 0 \\ 0 & c\gamma & -s\gamma \\ 0 & s\gamma & c\gamma \end{bmatrix}$$

$$R_y(\beta) = \begin{bmatrix} c\beta & 0 & s\beta \\ 0 & 1 & 0 \\ -s\beta & 0 & c\beta \end{bmatrix}$$

$$R_z(\alpha) = \begin{bmatrix} c\alpha & -s\alpha & 0 \\ s\alpha & c\alpha & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

Norms

$$||x||_p = \left(\sum_i |x_i|^p \right)^{\frac{1}{p}}$$

Norm of Matrix

$$||A||_p = \max_{x \neq 0} \left(\frac{||Ax||_p}{||x||_p} \right)$$

Condition Number

$$||A^{-1}||\ ||A|| = cond(A)$$

SVD

$$A = U\ \Sigma\ V^T$$

Polar Decomposition

$$\begin{aligned} A &= U\ V^T\ V\Sigma\ V^T \\ W &= U\ V^T \\ P &= V\ \Sigma V^T \end{aligned}$$