The Markdown parser included in the Jupyter Notebook is MathJax-aware. This means that you can freely mix in mathematical expressions using the MathJax subset of Tex and LaTeX. Some examples from the MathJax demos site are reproduced below, as well as the Markdown+TeX source.

Motivating Examples

The Lorenz Equations

Source

```
\begin{align}
\dot{x} & = \sigma(y-x) \\
\dot{y} & = \rho x - y - xz \\
\dot{z} & = -\beta z + xy
\end{align}
```

Display

$$\dot{x} = \sigma(y - x)$$

$$\dot{y} = \rho x - y - xz$$

$$\dot{z} = -\beta z + xy$$

The Cauchy-Schwarz Inequality

Source

```
\begin{equation*}
\left( \sum_{k=1}^n a_k b_k \right)^2 \leq \left( \sum_{k=1}^n a_k^2 \right)
\left( \sum_{k=1}^n b_k^2 \right)
\end{equation*}
```

Display

$$\left(\sum_{k=1}^n a_k b_k \right)^2 \leq \left(\sum_{k=1}^n a_k^2 \right) \left(\sum_{k=1}^n b_k^2 \right)$$

A Cross Product Formula

Source

```
\begin{equation*}
\mathbf{V}_1 \times \mathbf{V}_2 =  \begin{vmatrix}
\mathbf{i} & \mathbf{j} & \mathbf{k} \\
\frac{\partial X}{\partial u} &  \frac{\partial Y}{\partial u} & 0 \\
\frac{\partial X}{\partial v} &  \frac{\partial Y}{\partial v} & 0
\end{vmatrix}
\end{equation*}
```

Display

$$\mathbf{V}_1 \times \mathbf{V}_2 = \begin{vmatrix} \mathbf{i} & \mathbf{j} & \mathbf{k} \\ \frac{\partial X}{\partial u} & \frac{\partial Y}{\partial u} & 0 \\ \frac{\partial X}{\partial v} & \frac{\partial Y}{\partial v} & 0 \end{vmatrix}$$

The probability of getting (k) heads when flipping (n) coins is

Source

```
\begin{equation*}
P(E)   = {n \choose k} p^k (1-p)^{ n-k}
\end{equation*}
```

Display

$$P(E) = \binom{n}{k} p^k (1-p)^{n-k}$$

An Identity of Ramanujan

Source

```
\begin{equation*}
\frac{1}{\Bigl(\sqrt{\phi \sqrt{5}}-\phi\Bigr) e^{\frac25 \pi}} =
1+\frac{e^{-2\pi}} {1+\frac{e^{-4\pi}} {1+\frac{e^{-6\pi}}
{1+\frac{e^{-8\pi}} {1+\ldots} } } }
\end{equation*}
```

Display

$$\frac{1}{\left(\sqrt{\phi\sqrt{5}}-\phi\right) e^{\frac{2}{5}\pi}} = 1+\frac{e^{-2\pi}}{1+\frac{e^{-4\pi}}{1+\frac{e^{-6\pi}}{1+\frac{e^{-8\pi}}{1+\ldots}}}}$$

A Rogers-Ramanujan Identity

Source

```
\begin{equation*}
1 +  \frac{q^2}{(1-q)}+\frac{q^6}{(1-q)(1-q^2)}+\cdots =
\prod_{j=0}^{\infty}\frac{1}{(1-q^{5j+2})(1-q^{5j+3})},
\quad\quad \text{for $|q|<1$}.
\end{equation*}
```

Display

$$1 + \frac{q^2}{(1-q)} + \frac{q^6}{(1-q)(1-q^2)} + \cdots = \prod_{j=0}^{\infty} \frac{1}{(1-q^{5j+2})(1-q^{5j+3})}, \qquad \text{for } \mid q \mid < 1.$$

Maxwell's Equations

Source

```
\begin{align}
\nabla \times \vec{\mathbf{B}} -\, \frac1c\, \frac{\partial\vec{\mathbf{E}}}{\partial
t} & = \frac{4\pi}{c}\vec{\mathbf{j}} \\   \nabla \cdot \vec{\mathbf{E}} & = 4 \pi
\rho \\
\nabla \times \vec{\mathbf{E}}\, +\, \frac1c\, \frac{\partial\vec{\mathbf{B}}}
{\partial t} & = \vec{\mathbf{0}} \\
\nabla \cdot \vec{\mathbf{B}} & = 0
\end{align}
```

Display

$$\begin{aligned}
\nabla \times \vec{\mathbf{B}} - \frac{1}{c}\frac{\partial \vec{\mathbf{E}}}{\partial t} &= \frac{4\pi}{c}\vec{\mathbf{j}} \\
\nabla \cdot \vec{\mathbf{E}} &= 4\pi\rho \\
\nabla \times \vec{\mathbf{E}} + \frac{1}{c}\frac{\partial \vec{\mathbf{B}}}{\partial t} &= \vec{\mathbf{0}} \\
\nabla \cdot \vec{\mathbf{B}} &= 0
\end{aligned}$$

Equation Numbering and References

Equation numbering and referencing will be available in a future version of the Jupyter notebook.

Inline Typesetting (Mixing Markdown and TeX)

While display equations look good for a page of samples, the ability to mix math and *formatted* **text** in a paragraph is also important.

Source

```
This expression $\sqrt{3x-1}+(1+x)^2$ is an example of a TeX inline equation in a [Markdown-formatted](https://daringfireball.net/projects/markdown/) sentence.
```

Display

This expression $\sqrt{3x-1}+(1+x)^2$ is an example of a TeX inline equation in a Markdown-formatted sentence.

Other Syntax

You will notice in other places on the web that `$$` are needed explicitly to begin and end MathJax typesetting. This is **not** required if you will be using TeX environments, but the Jupyter notebook will accept this syntax on legacy notebooks.

Source

```
$$
\begin{array}{c}
y_1 \\\
y_2 \mathtt{t}_i \\\
z_{3,4}
\end{array}
$$
```

```
$$
\begin{array}{c}
y_1 \cr
y_2 \mathtt{t}_i \cr
y_{3}
\end{array}
$$
```

```
$$\begin{eqnarray}
x' &=& &x \sin\phi &+& z \cos\phi \\
z' &=& - &x \cos\phi &+& z \sin\phi \\
\end{eqnarray}$$
```

```
$$
x=4
$$
```

Display

$$
\begin{array}{c}
y_1 \\\
y_2 \mathtt{t}_i \\\
z_{3,4}
\end{array}
$$

$$
\begin{array}{c}
y_1 \cr
y_2 \mathtt{t}_i \cr
y_{3}
\end{array}
$$

eqnarray is unsupported by mitex

$$
x=4
$$