Hello World!

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1 Getting Started

Hello World! Today I am learning LaTeX.LaTeX is a great program for writing math. I can write in line math such as $a^2 + b^2 = c^2$. I can also give equations their own space:

$$\gamma^2 + \theta^2 = \omega^2 \tag{1}$$

"Maxwell's equantions" are named for James Clark Maxwell and are as follow:

$$\begin{aligned}
\vec{\nabla} \cdot \vec{E} &= \frac{\rho}{\epsilon_0} && \text{Gauss's Law} \quad (2)\\
\vec{\nabla} \cdot \vec{B} &= 0 && \text{Gauss's Law of Magnetism} \quad (3)\\
\vec{\nabla} \times \vec{E} &= -\frac{\partial \vec{B}}{\partial t} && \text{Faraday's Law of Induction} \quad (4)\\
\vec{\nabla} \times \vec{B} &= \mu_0 \left(\epsilon_0 \frac{\partial \vec{E}}{\partial t} + \vec{J} \right) && \text{Ampere's Circuital Law} \quad (5)
\end{aligned}$$

Equations 2, 3, 4 and 5 some of the most important in Physics.

2 What about Matrix Equations?

$$\begin{pmatrix} a_{11} & a_{12} & \cdots & a_{1n} \\ a_{21} & a_{22} & \cdots & a_{1n} \\ \vdots & \vdots & \ddots & \vdots \\ a_{n1} & a_{n2} & \cdots & a_{nn} \end{pmatrix} \begin{bmatrix} v_1 \\ v_2 \\ \vdots \\ v_n \end{bmatrix} = \begin{matrix} w_1 \\ w_2 \\ \vdots \\ w_n \end{matrix}$$

$$\iiint_V f(x,y,z)\,\mathrm{d}V = F$$

$$\frac{\mathrm{d}x}{\mathrm{d}y} = x' = \lim_{h \to 0} \frac{f(x+h)-f(x)}{h}$$

$$|\ x\ |= \begin{cases} -x, & if\ x < 0 \\ x, & if\ x \geq 0 \end{cases}$$

$$F(x) = A_0 + \sum_{n=1}^{N} \left[A_n \cos\left(\frac{2\pi n x}{P}\right) + B_n \sin\left(\frac{2\pi n x}{P}\right) \right]$$

$$\sum_n \frac{1}{n^s} = \prod_p \frac{1}{1-\frac{1}{p^s}}$$

$$m\ddot{x} + c\dot{x} + kx = F_0 \sin\left(2\pi f t\right)$$

$$\begin{aligned} f(x) &= x^2 + 3x + 5x^2 + 8 + 6x \\ &= 6x^2 + 9x + 8 \\ &= x\left(6x + 9\right) + 8 \end{aligned}$$

$$X = \frac{F_0}{k} \frac{1}{\sqrt{\left(1-r^2\right)^2 + \left(2\zeta r\right)^2}}$$

$$G_{\mu\nu} \equiv R_{\mu\nu} - \frac{1}{2} R g_{\mu\nu} = \frac{8\pi G}{c^4} T_{\mu\nu}$$

$$6\,\mathrm{CO_2} + 6\,\mathrm{H_2O} \rightarrow \mathrm{C_6H_{12}} + 6\,\mathrm{O_2}$$

$$\mathrm{SO_4}^{2-} + \mathrm{Ba}^{2} \rightarrow \mathrm{BaSO_4}$$

$$\begin{pmatrix} a_{11} & a_{12} & \cdots & a_{1n} \\ a_{21} & a_{22} & \cdots & a_{1n} \\ \vdots & \vdots & \ddots & \vdots \\ a_{n1} & a_{n2} & \cdots & a_{nn} \end{pmatrix} \begin{pmatrix} v_1 \\ v_2 \\ \vdots \\ v_n \end{pmatrix} = \begin{pmatrix} w_1 \\ w_2 \\ \vdots \\ w_n \end{pmatrix}$$

$$\frac{\partial \mathbf{u}}{\partial} + \left(\mathbf{u} \cdot \nabla\right) \mathbf{u} - \nu \nabla^2 \left(\mathbf{u}\right) = -\nabla \mathbf{h}$$

$$\alpha A \beta B \gamma \Gamma \delta \Delta \pi \Pi \omega \Omega$$