Hello World!

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1 Getting Started

Hello World! Today I am learning LaTeX. LaTeXis 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 equations" are named for James Clark Maxwell and are as follow:

$$\vec{\nabla}.\vec{E} = \frac{\rho}{\epsilon_0} \qquad \text{Gauss's Law} \tag{2}$$

$$\vec{\nabla}.\vec{B} = 0 \qquad \text{Gauss's Law for Magnetism} \tag{3}$$

$$\vec{\nabla}.\vec{E} = -\frac{\partial \vec{B}}{\partial t} \qquad \text{Faraday's Law of Induction} \tag{4}$$

$$\vec{\nabla}.\vec{B} = \mu_0 \left(\epsilon_0 \frac{\partial \vec{E}}{\partial t} + \vec{J}\right) \qquad \text{Ampere's Circuital Law} \tag{5}$$

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

2 What about Matrix Equations?

$$\begin{pmatrix} a_{11} & a_{12} & \cdots & a_{1n} \\ a_{21} & a_{22} & \cdots & a_{2n} \\ \vdots & \vdots & \ddots & \vdots \\ a_{n1} & a_{n2} & \cdots & a_{nn} \end{pmatrix} \begin{bmatrix} v_1 \\ v_2 \\ \vdots \\ v_n \end{bmatrix} = \begin{matrix} w_1 \\ w_2 \\ \vdots \\ w_n \end{matrix}$$

$$\int\int\int_{V} f(x,y,z)dV = F$$

$$\frac{dx}{dy} = x' = \lim_{h \to 0} \frac{f(x+h] - f(x)}{h}$$

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

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

$$\sum_{n} \frac{1}{n^s} = \prod_{p} \frac{1}{1 - p^{-s}}$$

$$m\ddot{x} + c\dot{x} + kx = F_0 \sin(2\pi ft)$$

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

$$X = \frac{f_0}{k} \frac{1}{\sqrt{(1 - r^2)^2 + (2\zeta r)^2}}$$

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

$$6CO_2 + 6H_2O \rightarrow C_6H_{12}O_6 + 6O_2$$

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

$$\begin{pmatrix} a_{11} & a_{12} & \cdots & a_{1n} \\ a_{21} & a_{22} & \cdots & a_{2n} \\ \vdots & \vdots & \ddots & \vdots \\ a_{n1} & a_{n2} & \cdots & a_{nn} \end{pmatrix} \begin{pmatrix} v_1 \\ v_2 \\ \vdots \\ v_n \end{pmatrix} = \begin{pmatrix} w_1 \\ w_2 \\ \vdots \\ w_n \end{pmatrix}$$

$$\frac{\partial u}{\partial t} + (u.\nabla)u - \nu\nabla^2(u) - \nabla h$$

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