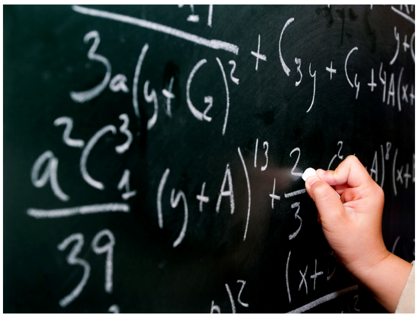
"Kurkistuksia fysiikan matematiikkaan ..."

- merkittävää fysiikan matematiikkaa -



GRAVITAATIOLAKI

$$F_g = \frac{Gm_1 m_2}{r^2}$$

MAXWELLIN YHTÄLÖT

$$\nabla \cdot E = \frac{\rho}{\varepsilon_0} = 4\pi k \rho$$

$$\nabla \cdot B = 0$$

$$\nabla x\ E = -\frac{\partial B}{\partial t}$$

$$\nabla\ x\ B = \frac{4\pi k}{c^2} J + \frac{1}{c^2}\frac{\partial E}{\partial t}$$

$$= \frac{J}{\varepsilon_0 c^2} + \frac{1}{c^2}\frac{\partial E}{\partial t}$$

$k = \frac{1}{4\pi\varepsilon_0} =$ Coulomb's constant $\quad c^2 = \frac{1}{\mu_0 \varepsilon_0}$

$$\oint \vec{E} \cdot d\vec{A} = \frac{q}{\varepsilon_0}$$

$$\oint \vec{B} \cdot d\vec{A} = 0$$

$$\oint \vec{E} \cdot d\vec{s} = -\frac{d\Phi_B}{dt}$$

$$\oint \vec{B} \cdot d\vec{s} = \mu_0 i + \frac{1}{c^2}\frac{\partial}{\partial t}\int \vec{E} \cdot d\vec{A}$$

KVANTTIHYPOTEESI

$$E = h\nu = \frac{hc}{\lambda}$$

PLANCKIN MUSTAN KAPPALEEN SÄTEILYLAKI

$$I(\lambda) = \frac{2hc^2}{\lambda^5}\frac{1}{e^{hc/\lambda kT} - 1}$$

DE BROGLIEN AINEAALTOHYPOTEESI

$$\lambda = \frac{h}{p}$$

HEISENBERGIN EPÄTARKKUUSPERIAATTEET

$$\Delta x \Delta p \geq \frac{\hbar}{2}$$

$$\Delta t \Delta E \geq \frac{\hbar}{2}$$

$$\hbar = \frac{h}{2\pi}$$

SCHRÖDINGERIN YHTÄLÖ

$$-\frac{\hbar^2}{2m}\nabla^2\psi(\mathbf{r}) + V(\mathbf{r})\psi(\mathbf{r}) = E\psi(\mathbf{r})$$

$$i\hbar\frac{\partial\psi(\mathbf{r},t)}{\partial t} = -\frac{\hbar^2}{2m}\nabla^2\psi(\mathbf{r},t) + V(\mathbf{r})\psi(\mathbf{r},t)$$

$$i\hbar\frac{\partial}{\partial t}\Psi(\vec{x},t) = \hat{H}\Psi(\vec{x},t)$$

$$\hat{H} = -\frac{\hbar}{2m}\nabla^2 + V(\vec{x}) \qquad \nabla^2 = \frac{\partial^2}{\partial x^2} + \frac{\partial^2}{\partial y^2} + \frac{\partial^2}{\partial z^2}$$

EINSTEININ KENTTÄYHTÄLÖT

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

$$G_{\mu\nu} = R_{\mu\nu} - \frac{1}{2}\mathcal{R}g_{\mu\nu}$$

$$G_{\mu\nu} = -\frac{8\pi G}{c^4}T_{\mu\nu}$$