$$\nabla^2 f = \nabla \cdot \nabla f = \nabla \cdot \langle f_x, f_y, f_z \rangle = f_{xx} + f_{yy} + f_{zz}$$

$$\nabla^2 \bar{F} = \nabla^2 \langle P, Q, R \rangle$$

Laplace Operator

I am what I am and what I am is what I want.

$$= \langle \nabla^2 P, \nabla^2 Q, \nabla^2 R \rangle$$

$$= \langle P_{xx} + P_{yy} + P_{zz}, Q_x + Q_{yy} + Q_{zz}, R_{xx} + R_{yy} + R_{zz} \rangle$$

$$\iint_S f(x,y)\, dS$$

$$dS = \|\bar{r}_x \times \bar{r}_y\|\, dx\,dy$$

$$z = g(x,y)$$

$$\bar{r} = \langle x, y, g(x,y)\rangle$$

$$\bar{r}_x = \langle 1, 0, g_x\rangle \quad 1, 0$$

$$\times \quad \bar{r}_y = \langle 0, 1, g_y\rangle \quad 0, 1$$

$$\langle -g_x, -g_y, 1\rangle$$

$$\int \bar{F}\cdot d\bar{r}$$

$$\bar{F}\cdot d\bar{r} = \bar{F}\cdot\bar{T}\ \|\bar{r}'\|\, dt$$

$$= \bar{F}\cdot\frac{\bar{r}'}{\|\bar{r}'\|}\ \|\bar{r}'\|\, dt$$

$$= \bar{F}\cdot\bar{r}'(t)\, dt$$

$$\bar{F}\cdot d\bar{S}$$

$\iint \sim dS$ $\qquad$ $\iint \sim d\bar{S}$

$\bar{i}, \bar{j}, \bar{k}$ $\qquad$ $\bar{F}\cdot d\bar{S}$

$\text{curl}\,\bar{F}\cdot d\bar{S}$

$\hat{c}$

$+C$ $\qquad$ $\iint \sim d\phi\, d\theta$ <u>is</u> standard