Formler og konvensjoner

Diskriminanten i andrederiverttesten:
$$\Delta = AC - B^2 \quad \text{der} \quad A = f_{xx},\ B = f_{xy},\ C = f_{yy}$$

Formler for skifte av variabler:
$$\mathrm{d}x\,\mathrm{d}y = \left|\frac{\partial(x,y)}{\partial(u,v)}\right|\mathrm{d}u\,\mathrm{d}v, \quad \mathrm{d}x\,\mathrm{d}y\,\mathrm{d}z = \left|\frac{\partial(x,y,z)}{\partial(u,v,w)}\right|\mathrm{d}u\,\mathrm{d}v\,\mathrm{d}w$$

Sylinderkoordinater (r,θ,z):
$$x = r\cos\theta, \quad y = r\sin(\theta), \quad z = z,$$
$$r^2 = x^2 + y^2, \quad \mathrm{d}x\,\mathrm{d}y\,\mathrm{d}z = r\,\mathrm{d}r\,\mathrm{d}\theta\,\mathrm{d}z$$

Kulekoordinater (ρ,φ,θ):
$$x = \rho\cos(\theta)\sin(\varphi), \quad y = \rho\sin(\theta)\sin(\varphi), \quad z = \rho\cos(\varphi),$$
$$\rho^2 = x^2 + y^2 + z^2, \quad \mathrm{d}x\,\mathrm{d}y\,\mathrm{d}z = \rho^2\sin(\varphi)\,\mathrm{d}\rho\,\mathrm{d}\theta\,\mathrm{d}\varphi$$

Flateintegral:
$$\mathrm{d}S = |\mathbf{r}_u \times \mathbf{r}_v|\,\mathrm{d}u\,\mathrm{d}v$$

Spesialtilfellet $z = g(x,y)$:
$$\mathrm{d}S = \sqrt{1 + g_x^2 + g_y^2}\,\mathrm{d}x\,\mathrm{d}y$$

Vektoranalyse $\mathbf{F} = P\mathbf{i} + Q\mathbf{j} + R\mathbf{k}$:

$$\mathrm{curl}(\mathbf{F}) = \left(\frac{\partial R}{\partial y} - \frac{\partial Q}{\partial z}, \frac{\partial P}{\partial z} - \frac{\partial R}{\partial x}, \frac{\partial Q}{\partial x} - \frac{\partial P}{\partial y}\right), \quad \mathrm{div}(\mathbf{F}) = \frac{\partial P}{\partial x} + \frac{\partial Q}{\partial y} + \frac{\partial R}{\partial z}$$

Green sitt teorem: $\displaystyle\int_{\partial D} P\,\mathrm{d}x + Q\,\mathrm{d}y = \iint_D \left(\frac{\partial Q}{\partial x} - \frac{\partial P}{\partial y}\right)\mathrm{d}x\,\mathrm{d}y$

Stokes sitt teorem: $\displaystyle\int_{\partial S} \mathbf{F}\cdot\mathrm{d}\mathbf{s} = \iint_S \mathrm{curl}(\mathbf{F})\cdot\mathrm{d}\mathbf{S}$

Divergensteoremet: $\displaystyle\iint_{\partial V} \mathbf{F}\cdot\mathrm{d}\mathbf{S} = \iint_{\partial V} \mathbf{F}\cdot\mathbf{n}\,\mathrm{d}S = \iiint_V \mathrm{div}(\mathbf{F})\,\mathrm{d}V$