FORMELLISTE FOR
MA1103 FLERDIMENSJONAL ANALYSE

Diskriminanten i annenderiverttesten:

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

Variabelskifteformler:

$$\mathrm{d}x\,\mathrm{d}y = \left|\frac{\partial(x,y)}{\partial(u,v)}\right|\mathrm{d}u\,\mathrm{d}v, \qquad \mathrm{d}x\,\mathrm{d}y\,\mathrm{d}z = \left|\frac{\partial(x,y,z)}{\partial(u,v,w)}\right|\mathrm{d}u\,\mathrm{d}v\,\mathrm{d}w$$

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):

$$x = \rho\sin\varphi\cos\theta, \quad y = \rho\sin\varphi\sin\theta, \quad z = \rho\cos\varphi,$$

$$\rho^2 = x^2 + y^2 + z^2, \quad \mathrm{d}x\,\mathrm{d}y\,\mathrm{d}z = \rho^2\sin\varphi\,\mathrm{d}\rho\,\mathrm{d}\theta\,\mathrm{d}\varphi$$

Flateintegral:

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

Spesialtilfelle: $\quad \mathrm{d}S = \sqrt{1 + g_x^2 + g_y^2}\,\mathrm{d}x\,\mathrm{d}y$

Tyngdepunkt for romlige legemer:

$$\bar{x} = \frac{1}{m}\iiint_T x\,\mathrm{d}m, \quad \bar{y} = \frac{1}{m}\iiint_T y\,\mathrm{d}m, \quad \bar{z} = \frac{1}{m}\iiint_T z\,\mathrm{d}m$$

Vektoranalyse:

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

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

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