FORMELLISTE FOR
MA1103 FLERDIMENSJONAL ANALYSE

Dekomponering av akselerasjonsvektor:

$$\mathbf{a}(t) = v'(t)\,\hat{\mathbf{T}}(t) + \kappa(t)v^2(t)\,\hat{\mathbf{N}}(t)$$

Diskriminanten i annenderiverttesten:

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

Koordinatsystemer:

Sylinderkoordinater $(r,\,\theta,\,z)$:

$$x = r\,\cos\theta, \quad y = r\,\sin\theta, \quad z = z,$$
$$r^2 = x^2 + y^2, \quad dV = r\,dz\,dr\,d\theta$$

Kulekoordinater $(\rho,\,\varphi,\,\theta)$:

$$x = \rho\,\sin\varphi\,\cos\theta, \quad y = \rho\,\sin\varphi\,\sin\theta, \quad z = \rho\,\cos\varphi,$$
$$\rho^2 = x^2 + y^2 + z^2, \quad dV = \rho^2\sin\varphi\,d\rho\,d\varphi\,d\theta$$

Flateintegral:

$$dS = |\mathbf{n}(u,v)|du\,dv = \left|\frac{\partial \mathbf{r}}{\partial u} \times \frac{\partial \mathbf{r}}{\partial v}\right| du\,dv$$

Spesialtilfelle: $\quad dS = \sqrt{1 + f_x^2 + f_y^2}\,dx\,dy$

Tyngdepunkt for romlige legemer:

$$\overline{x} = \frac{1}{m}\iiint_R x\,dm, \quad \overline{y} = \frac{1}{m}\iiint_R y\,dm, \quad \overline{z} = \frac{1}{m}\iiint_R z\,dm$$

Vektoranalyse:

Greens teorem: $\quad \oint_C F_1\,dx + F_2\,dy = \iint_R \left(\frac{\partial F_2}{\partial x} - \frac{\partial F_1}{\partial y}\right) dA$

Divergensteoremet: $\quad \oiint_S \mathbf{F}\cdot\hat{\mathbf{N}}\,dS = \iiint_D \operatorname{div}\mathbf{F}\,dV$

Stokes' teorem: $\quad \oint_C \mathbf{F}\cdot\hat{\mathbf{T}}\,ds = \iint_S (\operatorname{curl}\mathbf{F})\cdot\hat{\mathbf{N}}\,dS$