Formelliste

Dekomposisjon av akselerasjonsvektoren:

$$\boldsymbol{a}(t) = \frac{d}{dt}|\boldsymbol{v}(t)|\,\boldsymbol{T}(t) + \kappa(t)|\boldsymbol{v}(t)|^2\,\boldsymbol{N}(t) = \dot{v}(t)\,\boldsymbol{T}(t) + \kappa(t)v^2(t)\,\boldsymbol{N}(t)$$

Krumning og torsjon:

$$\kappa = \frac{d\boldsymbol{T}}{ds}\cdot\boldsymbol{N} = \frac{|\boldsymbol{v}\times\boldsymbol{a}|}{|\boldsymbol{v}|^3}, \qquad \tau = -\frac{d\boldsymbol{B}}{ds}\cdot\boldsymbol{N} = \frac{(\boldsymbol{v}\times\boldsymbol{a})\cdot\dot{\boldsymbol{a}}}{|\boldsymbol{v}\times\boldsymbol{a}|^2}$$

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:

$$d\sigma = |\boldsymbol{N}(u,v)|du\,dv = \left|\frac{\partial\boldsymbol{r}}{\partial u}\times\frac{\partial\boldsymbol{r}}{\partial v}\right| du\,dv \qquad \text{(I noen bøker er } d\sigma = dS\text{)}$$

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

Tyngdepunktet til et romlige legeme med tetthet δ og masse $M = \iiint_T \delta\,dV$:

$$\overline{x} = \frac{1}{M}\iiint_T x\,\delta\,dV, \quad \overline{y} = \frac{1}{M}\iiint_T y\,\delta\,dV, \quad \overline{z} = \frac{1}{M}\iiint_T z\,\delta\,dV$$

Vektoranalyse:

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

Divergensteoremet: $\displaystyle\iint_S \boldsymbol{F}\cdot\boldsymbol{n}\,d\sigma = \iiint_T \operatorname{div}\boldsymbol{F}\,dV = \left(\iiint_T \boldsymbol{\nabla}\cdot\boldsymbol{F}\,dV\right)$

Stokes' teorem: $\displaystyle\oint_C \boldsymbol{F}\cdot\boldsymbol{T}\,ds = \iint_S (\operatorname{curl}\boldsymbol{F})\cdot\boldsymbol{n}\,d\sigma = \left(\iint_S (\boldsymbol{\nabla}\times\boldsymbol{F})\cdot\boldsymbol{n}\,d\sigma\right)$