

# Formelliste

Annenderiverttesten er basert på

$$f_{xx}f_{yy} - f_{xy}^2$$

## 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  $(R, \phi, \theta)$

$$x = R \sin \phi \cos \theta, \quad y = R \sin \phi \sin \theta, \quad z = R \cos \phi$$

$$R^2 = x^2 + y^2 + z^2, \quad dV = R^2 \sin \phi \, dR \, d\phi \, d\theta$$

## Variabelskifte

$$dx \, dy = \left| \frac{\partial(x, y)}{\partial(u, v)} \right| du \, dv = \left| \frac{\partial x}{\partial u} \frac{\partial y}{\partial v} - \frac{\partial x}{\partial v} \frac{\partial y}{\partial u} \right| du \, dv \text{ og tilsvarende i tre dimensjoner}$$

## Flateintegral

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

## Tyngdepunkt for romlige legemer

$$\bar{x} = \frac{1}{m} \iiint_T x \, dm, \quad \bar{y} = \frac{1}{m} \iiint_T y \, dm, \quad \bar{z} = \frac{1}{m} \iiint_T z \, dm, \quad dm = \rho(x, y, z) \, dV$$

## Vektoranalyse

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

Divergensteoremet: 
$$\iint_S \mathbf{F} \cdot \hat{\mathbf{N}} \, dS = \iiint_T \operatorname{div} \mathbf{F} \, dV$$

Stokes' teorem: 
$$\oint_C \mathbf{F} \cdot d\mathbf{r} = \iint_S (\operatorname{curl} \mathbf{F}) \cdot \hat{\mathbf{N}} \, dS$$