

Formelliste

Annenderiverttesten er basert på

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

Krumning

$$\kappa = \frac{|\mathbf{v} \times \mathbf{a}|}{|\mathbf{v}|^3}$$

Koordinatsystemer

Sylinderkoordinater (r, θ, 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 (ρ, φ, θ)

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

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

Variabelskifte

$$\frac{\partial(x, y)}{\partial(u, v)} = \begin{vmatrix} \frac{\partial x}{\partial u} & \frac{\partial x}{\partial v} \\ \frac{\partial y}{\partial u} & \frac{\partial y}{\partial v} \end{vmatrix} = \frac{\partial x}{\partial u} \frac{\partial y}{\partial v} - \frac{\partial x}{\partial v} \frac{\partial y}{\partial u}$$

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

Flateintegral

$$dS = \left| \frac{\partial \mathbf{r}}{\partial u} \times \frac{\partial \mathbf{r}}{\partial v} \right| du \, dv \quad \text{eller} \quad dS = \frac{|\nabla G|}{|\partial G / \partial z|} dx \, dy$$

Vektoranalyse

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

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

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