Definition 0.0.1: Variabelsubtitution i cylindriska koordinater

$x = rcos(\theta)$, $y = rsin(\theta)$, $z = z$. Determinanten av Jakobimatrisen ges då av:

$$A = \begin{pmatrix} \frac{\partial x}{\partial r} & \frac{\partial x}{\partial \theta} & \frac{\partial x}{\partial z} \\ \frac{\partial y}{\partial r} & \frac{\partial y}{\partial \theta} & \frac{\partial z}{\partial z} \\ \frac{\partial z}{\partial r} & \frac{\partial z}{\partial \theta} & \frac{\partial z}{\partial z} \end{pmatrix} = \begin{pmatrix} cos(\theta) & -rsin(\theta) & 0 \\ sin(\theta) & rcos(\theta) & 0 \\ 0 & 0 & 1 \end{pmatrix}$$

$det(A) = r \implies dxdydz = rdrd\theta dz$