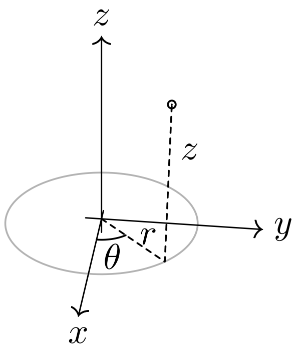
Variabelsubstitution i trippelintegraler

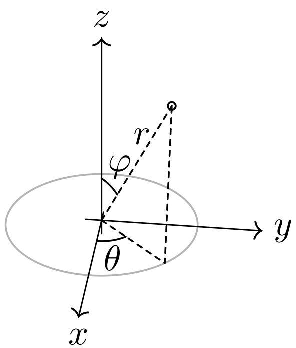


Cylindriska koordinater

$$x = r\cos\theta$$
$$y = r\sin\theta$$
$$z = z$$

Volymelement

$$dx\,dy\,dz = r\,dr\,d\theta\,dz$$



Sfäriska koordinater

$$x = r\sin\varphi\cos\theta$$
$$y = r\sin\varphi\sin\theta$$
$$z = r\cos\varphi$$

Volymelement

$$dx\,dy\,dz = r^2\sin\varphi\,dr\,d\varphi\,d\theta$$

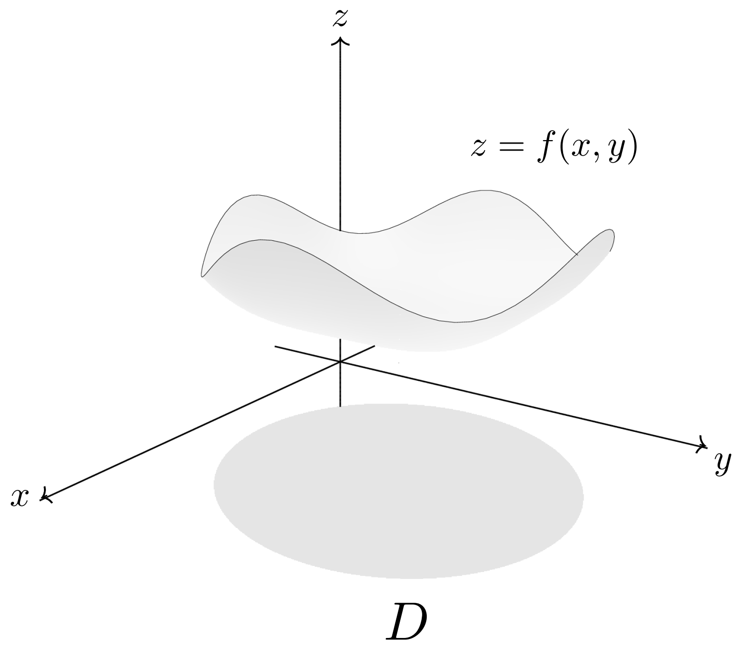
Allmänna koordinater

$$x = x(u,v,w)$$
$$y = y(u,v,w)$$
$$z = z(u,v,w)$$

Volymelement

$$dx\,dy\,dz = \left|\det\frac{\partial(x,y,z)}{\partial(u,v,w)}\right|du\,dv\,dw$$

Area av en funktionsyta



Arean av en funktionsyta $z = f(x,y)$ innanför området D i x,y-planet är

$$\text{Area} = \iint_D \sqrt{1 + \left(\frac{\partial f}{\partial x}\right)^2 + \left(\frac{\partial f}{\partial y}\right)^2}\,dx\,dy.$$