

## Hodnoty goniometrických integrálů:

$$\int_0^{\pi/2} \cos^m(x) \sin^n(x) dx = \frac{\Gamma\left(\frac{m+1}{2}\right)\Gamma\left(\frac{n+1}{2}\right)}{2 \cdot \Gamma\left(\frac{m+n+2}{2}\right)}; \quad \Gamma(k) = (k-1)!; \quad \Gamma\left(k + \frac{1}{2}\right) = \sqrt{\pi} \frac{(2k-1)!!}{2^k}$$

## Hodnoty jacobíánů vybraných souřadnic:

$$\begin{aligned} x &= s + a\rho \cos(\varphi) \\ y &= t + b\rho \sin(\varphi) \end{aligned}$$

$$\det\left(\frac{\mathcal{D}(x, y)}{\mathcal{D}(\rho, \varphi)}\right) = ab\rho.$$

$$\begin{aligned} x &= s + a\rho \cos^\alpha(\varphi) \\ y &= t + b\rho \sin^\alpha(\varphi) \end{aligned}$$

$$\det\left(\frac{\mathcal{D}(x, y)}{\mathcal{D}(\rho, \varphi)}\right) = ab\alpha\rho \cos^{\alpha-1}(\varphi) \sin^{\alpha-1}(\varphi).$$

$$\begin{aligned} x &= s + a\rho \cos(\varphi) \\ y &= t + b\rho \sin(\varphi) \\ z &= u + ch \end{aligned}$$

$$\det\left(\frac{\mathcal{D}(x, y, z)}{\mathcal{D}(\rho, \varphi, h)}\right) = abc\rho.$$

$$\begin{aligned} x &= s + a\rho \cos^\alpha(\varphi) \\ y &= t + b\rho \sin^\alpha(\varphi) \\ z &= u + ch \end{aligned}$$

$$\det\left(\frac{\mathcal{D}(x, y, z)}{\mathcal{D}(\rho, \varphi, h)}\right) = abc\alpha\rho \cos^{\alpha-1}(\varphi) \sin^{\alpha-1}(\varphi).$$

$$\begin{aligned} x &= s + a\rho \cos(\vartheta) \cos(\varphi) \\ y &= t + b\rho \cos(\vartheta) \sin(\varphi) \\ z &= u + c\rho \sin(\vartheta) \end{aligned}$$

$$\det\left(\frac{\mathcal{D}(x, y, z)}{\mathcal{D}(\rho, \varphi, \vartheta)}\right) = abc\rho^2 \cos(\vartheta).$$

$$\begin{aligned} x &= s + a\rho \cos^\beta(\vartheta) \cos^\alpha(\varphi) \\ y &= t + b\rho \cos^\beta(\vartheta) \sin^\alpha(\varphi) \\ z &= u + c\rho \sin^\beta(\vartheta) \end{aligned}$$

$$\begin{aligned} \det\left(\frac{\mathcal{D}(x, y, z)}{\mathcal{D}(\rho, \varphi, \vartheta)}\right) &= \\ &= abc\alpha\beta\rho^2 \cos^{2\beta-1}(\vartheta) \sin^{\beta-1}(\vartheta) \cos^{\alpha-1}(\varphi) \sin^{\alpha-1}(\varphi). \end{aligned}$$

$$\begin{aligned} x &= s + a\rho \cos(\omega) \cos(\vartheta) \cos(\varphi) \\ y &= t + b\rho \cos(\omega) \cos(\vartheta) \sin(\varphi) \\ z &= u + c\rho \cos(\omega) \sin(\vartheta) \\ w &= v + d\rho \sin(\omega), \end{aligned}$$

$$\det\left(\frac{\mathcal{D}(x, y, z, w)}{\mathcal{D}(\rho, \omega, \varphi, \vartheta)}\right) = abcd\rho^3 \cos^2(\omega) \cos(\vartheta).$$