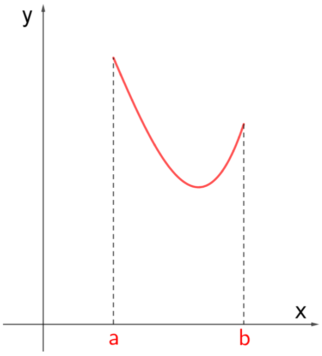
APLIKACE URČITÉHO INTEGRÁLU – VZORCE

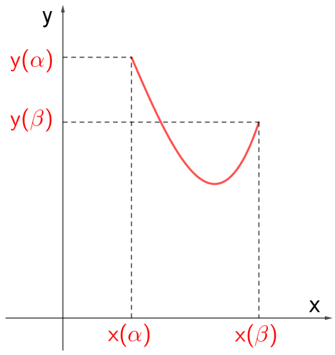
explicitně zadaná funkce

$y = f(x),\ x \in \langle a, b\rangle$



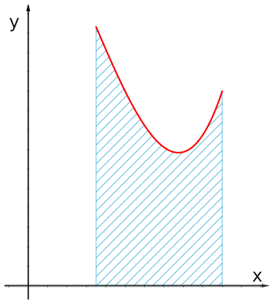
parametricky zadaná funkce

$$\begin{aligned} x &= x(t) \\ y &= y(t) \end{aligned} \qquad t \in \langle \alpha, \beta \rangle$$



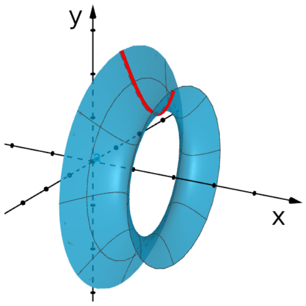
Obsah rovinné oblasti

$$S = \int_a^b f(x)\,\mathrm{d}x, \quad f(x) \geq 0 \qquad S = \int_\alpha^\beta y(t)|\dot{x}(t)|\,\mathrm{d}t$$



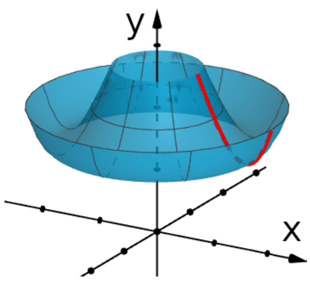
Objem rotačního tělesa kolem osy x

$$V = \pi \int_a^b f^2(x)\,\mathrm{d}x \qquad V = \pi \int_\alpha^\beta y^2(t)|\dot{x}(t)|\,\mathrm{d}t$$



Objem rotačního tělesa kolem osy y

$$V = 2\pi \int_a^b x \cdot f(x)\,\mathrm{d}x \qquad V = 2\pi \int_\alpha^\beta y(t)|x(t)\dot{x}(t)|\,\mathrm{d}t$$



Povrch pláště rotačního tělesa kolem osy x

$$S = 2\pi \int_a^b |f(x)|\sqrt{1 + (f'(x))^2}\,\mathrm{d}x \quad S = 2\pi \int_\alpha^\beta |y(t)|\sqrt{(\dot{x}(t))^2 + (\dot{y}(t))^2}\,\mathrm{d}t$$

Délka křivky

$$l = \int_a^b \sqrt{1 + (f'(x))^2}\,\mathrm{d}x \qquad l = \int_\alpha^\beta \sqrt{(\dot{x}(t))^2 + (\dot{y}(t))^2}\,\mathrm{d}t$$