GEOMETRICKÉ APLIKACE URČITÉHO INTEGRÁLU

	explicitní zadání	parametrické zadání
obsah rovinného obrazce	$P=\int_a^b (f(x)-g(x))\,\mathrm{d}x$ $f(x)\geq g(x)\ \forall x\in(a,b)$ $P=\int_c^d (f(y)-g(y))\,\mathrm{d}y$ $f(y)\geq g(y)\ \forall y\in(c,d)$	$P=\int_\alpha^\beta \psi(t)\lvert\varphi'(t)\rvert\,\mathrm{d}t$ $\psi(t)\geq 0,\ \varphi'(t)\neq 0$ pro $t\in(\alpha,\beta)$ $P=\int_\alpha^\beta \varphi(t)\lvert\psi'(t)\rvert\,\mathrm{d}t$ $\varphi(t)\geq 0,\ \psi'(t)\neq 0$ pro $t\in(\alpha,\beta)$
délka rovinné křivky	$L=\int_a^b \sqrt{1+(f'(x))^2}\,\mathrm{d}x$	$L=\int_\alpha^\beta \sqrt{(\varphi'(t))^2+(\psi'(t))^2}\,\mathrm{d}t$
objem rotačního tělesa	$V_x=\pi\int_a^b f^2(x)\,\mathrm{d}x$ $V_y=\pi\int_c^d g^2(y)\,\mathrm{d}y$	$V_x=\pi\int_\alpha^\beta \psi^2(t)\lvert\varphi'(t)\rvert\,\mathrm{d}t$ $\psi(t)\geq 0,\ \varphi'(t)\neq 0$ $V_y=\pi\int_\alpha^\beta \varphi^2(t)\lvert\psi'(t)\rvert\,\mathrm{d}t$ $\varphi(t)\geq 0,\ \psi'(t)\neq 0$
obsah rotační plochy	$P_x=2\pi\int_a^b f(x)\sqrt{1+(f'(x))^2}\,\mathrm{d}x$ $P_y=2\pi\int_c^d g(y)\sqrt{1+(g'(y))^2}\,\mathrm{d}y$	$P_x=2\pi\int_\alpha^\beta \psi(t)\sqrt{(\varphi'(t))^2+(\psi'(t))^2}\,\mathrm{d}t$ $\psi(t)\geq 0, t\in(\alpha,\beta)$ $P_y=2\pi\int_\alpha^\beta \varphi(t)\sqrt{(\varphi'(t))^2+(\psi'(t))^2}\,\mathrm{d}t$ $\varphi(t)\geq 0, t\in(\alpha,\beta)$

APLIKACE URČITÉHO INTEGRÁLU V MECHANICE (hmotnost, statický moment, moment setrvačnosti soustavy hmotných bodů)

• ROVINNÁ DESKA

	homogenní	nehomogenní
těžiště	$m=\sigma\int_a^b (f(x)-g(x))\,\mathrm{d}x$ $S_x=\frac{1}{2}\sigma\int_a^b \left(f^2(x)-g^2(x)\right)\mathrm{d}x$ $S_y=\sigma\int_a^b x\,(f(x)-g(x))\,\mathrm{d}x$	$m=\int_a^b \sigma(x)\,(f(x)-g(x))\,\mathrm{d}x$ $S_x=\frac{1}{2}\int_a^b \sigma(x)\left(f^2(x)-g^2(x)\right)\mathrm{d}x$ $S_y=\int_a^b \sigma(x)x\,(f(x)-g(x))\,\mathrm{d}x$
	$T=[x_T,y_T]=\left[\frac{S_y}{m},\frac{S_x}{m}\right]$	
momenty setrvačnosti	$I_x=\frac{1}{3}\sigma\int_a^b \left(f^3(x)-g^3(x)\right)\mathrm{d}x$ $I_y=\sigma\int_a^b x^2\,(f(x)-g(x))\,\mathrm{d}x$	$I_x=\frac{1}{3}\int_a^b \sigma(x)\left(f^3(x)-g^3(x)\right)\mathrm{d}x$ $I_y=\int_a^b \sigma(x)x^2\,(f(x)-g(x))\,\mathrm{d}x$

- ROVINNÝ OBLOUK

	homogenní	nehomogenní
ROVINNÝ OBLOUK - explicitní vyjádření		
těžiště	$m = \sigma \int_a^b \sqrt{1 + (f'(x))^2}\,\mathrm{d}x$	$m = \int_a^b \sigma(x)\sqrt{1 + (f'(x))^2}\,\mathrm{d}x$
	$S_x = \sigma \int_a^b f(x)\sqrt{1 + (f'(x))^2}\,\mathrm{d}x$	$S_x = \int_a^b \sigma(x) f(x)\sqrt{1 + (f'(x))^2}\,\mathrm{d}x$
	$S_y = \sigma \int_a^b x\sqrt{1 + (f'(x))^2}\,\mathrm{d}x$	$S_y = \int_a^b \sigma(x) x\sqrt{1 + (f'(x))^2}\,\mathrm{d}x$
	$T = [x_T, y_T] = \left[\frac{S_y}{m}, \frac{S_x}{m}\right]$	
momenty setrvačnosti	$I_x = \sigma \int_a^b f^2(x)\sqrt{1 + (f'(x))^2}\,\mathrm{d}x$	$I_x = \int_a^b \sigma(x) f^2(x)\sqrt{1 + (f'(x))^2}\,\mathrm{d}x$
	$I_y = \sigma \int_a^b x^2\sqrt{1 + (f'(x))^2}\,\mathrm{d}x$	$I_y = \int_a^b \sigma(x) x^2\sqrt{1 + (f'(x))^2}\,\mathrm{d}x$
ROVINNÝ OBLOUK - parametrické vyjádření		
těžiště	$m = \sigma \int_\alpha^\beta \sqrt{(\varphi'(t))^2 + (\psi'(t))^2}\,\mathrm{d}t$	$m = \int_\alpha^\beta \sigma(t)\sqrt{(\varphi'(t))^2 + (\psi'(t))^2}\,\mathrm{d}t$
	$S_x = \sigma \int_\alpha^\beta \psi(t)\sqrt{(\varphi'(t))^2 + (\psi'(t))^2}\,\mathrm{d}t$	$S_x = \int_\alpha^\beta \sigma(t)\psi(t)\sqrt{(\varphi'(t))^2 + (\psi'(t))^2}\,\mathrm{d}t$
	$S_y = \sigma \int_\alpha^\beta \varphi(t)\sqrt{(\varphi'(t))^2 + (\psi'(t))^2}\,\mathrm{d}t$	$S_y = \int_\alpha^\beta \sigma(t)\varphi(t)\sqrt{(\varphi'(t))^2 + (\psi'(t))^2}\,\mathrm{d}t$
	$T = [x_T, y_T] = \left[\frac{S_y}{m}, \frac{S_x}{m}\right]$	
momenty setrvačnosti	$I_x = \sigma \int_\alpha^\beta \psi^2(t)\sqrt{(\varphi'(t))^2 + (\psi'(t))^2}\,\mathrm{d}t$	$I_x = \int_\alpha^\beta \sigma(t)\psi^2(t)\sqrt{(\varphi'(t))^2 + (\psi'(t))^2}\,\mathrm{d}t$
	$I_y = \sigma \int_\alpha^\beta \varphi^2(t)\sqrt{(\varphi'(t))^2 + (\psi'(t))^2}\,\mathrm{d}t$	$I_y = \int_\alpha^\beta \sigma(t)\varphi^2(t)\sqrt{(\varphi'(t))^2 + (\psi'(t))^2}\,\mathrm{d}t$