Formulių lapas: Integralai

Pagrindinės neapibrėžtinio integralo savybės

$$\left(\int f(x)dx\right)' = f(x) \qquad \int f(x)dx = F(x) + C$$

$$\int (f(x) \pm g(x))dx = \int f(x)dx \pm g(x)dx$$

$$\int k \cdot f(x)dx = k\int f(x)dx \qquad \int f(kx+a)dx = \frac{1}{k}F(kx+a) + C$$

Pagrindinės neapibrėžtinio integralo formulės

$\int dx = x + C$	$\int a^x dx = \frac{a^x}{\ln a} + C$	$\int \frac{1}{(\sin x)^2}dx = -\operatorname{ctg} x + C$
$\int x^n dx = \frac{x^{n+1}}{n+1} + C$	$\int e^x dx = e^x + C$	$\int \frac{1}{\sqrt{1-x^2}}dx = arc\sin x + C$
$\int \frac{1}{x^2}dx = -\frac{1}{x} + C$	$\int \sin x\, dx = -\cos x + C$	$\int \frac{1}{1+x^2}dx = arc\operatorname{tg} x + C$
$\int \frac{1}{\sqrt{x}}dx = 2\sqrt{x} + C$	$\int \cos x\, dx = \sin x + C$	$\int \frac{dx}{a^2+x^2} = \frac{1}{a}arc\operatorname{tg}\frac{x}{a} + C$
$\int \frac{1}{x}dx = \ln\lvert x\rvert + C$	$\int \frac{1}{(\cos x)^2}dx = \operatorname{tg} x + C$	$\int \frac{dx}{a^2-x^2} = \frac{1}{2a}\ln\left\lvert\frac{a+x}{a-x}\right\rvert + C$

Pagalbinės neapibrėžtinio integralo formulės

$\int kdx = kx + C$	$\int e^{kx+a}dx = \frac{1}{k}\cdot e^{kx+a} + C$
$\int (kx+a)^n dx = \frac{1}{k}\cdot\frac{(kx+a)^{n+1}}{n+1} + C$	$\int \sin(kx+a)\,dx = -\frac{1}{k}\cdot\cos(\mathrm{k}x+a) + C$
$\int \frac{1}{kx+a}dx = \frac{1}{k}\cdot\ln\lvert kx+a\rvert + C$	$\int \cos(\mathrm{k}x+a)\,dx = \frac{1}{k}\cdot\sin(kx+a) + C$
$\int \frac{1}{(\sin(kx+a))^2}dx = -\frac{1}{k}\cdot\operatorname{ctg}(kx+a) + C$	
$\int \frac{1}{(\cos(kx+a))^2}dx = \frac{1}{k}\cdot\operatorname{tg}(kx+a) + C$	
$\int a^{kx+b}dx = \frac{1}{k}\cdot\frac{a^{kx+b}}{\ln a} + C$	

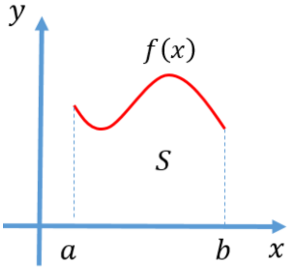
Apibrėžtinio integralo mechaninė (fizikinė) prasmė

$$\mathrm{s} = \int_{\mathrm{t}_1}^{\mathrm{t}_2}\mathrm{v(t)dt} \qquad \mathrm{v} = \int_{\mathrm{t}_1}^{\mathrm{t}_2}\mathrm{a(t)dt}$$

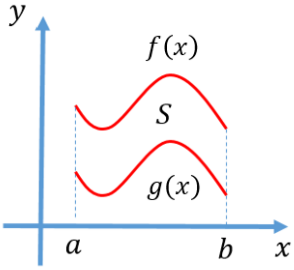
$v(t)$ – greitis; $s(t)$ – kelias; $a(t)$ – pagreitis.

Apibrėžtinio integralo geometrinė prasmė – kreivinės trapecijos plotas

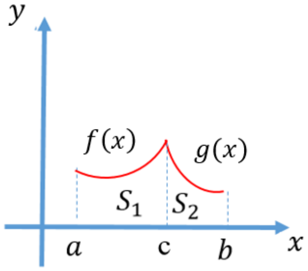
$$\mathrm{S} = \int_{\mathrm{a}}^{\mathrm{b}}\mathrm{f(x)dx} = \mathrm{F(x)}\big|_{\mathrm{a}}^{\mathrm{b}} = \mathrm{F(b)} - \mathrm{F(a)}$$



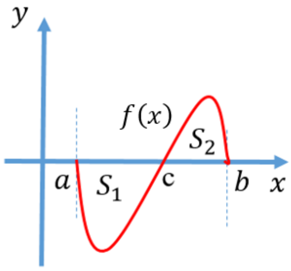
$S = \int_a^b f(x)dx$



$S = \int_a^b (f(x) - g(x))dx$



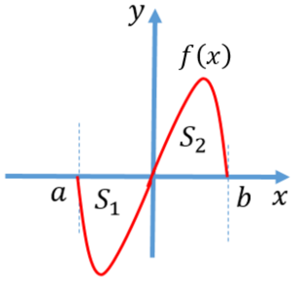
$S = S_1 + S_2$ $\quad S_1 = \int_a^c f(x)dx$ $\quad S_2 = \int_c^b g(x)dx$



$S = S_1 + S_2$

$$S_1 = -\int_a^c f(x)dx$$

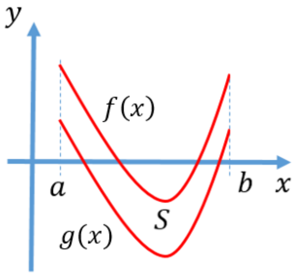
$$S_2 = \int_c^b f(x)dx$$



$Jei\ S_1 = S_2$

$$S = 2\int_0^b f(x)dx$$

$\boldsymbol{SVARBU}!$ $\int_a^b f(x)dx = 0$



$S = \int_a^b (f(x) - g(x))dx$