Universidade do Minho

Cálculo

Formulário 2 — 2018'19

Regras de derivação

(Omitem-se os domínios das funções e considera-se a uma constante apropriada.)

$a' = 0$

$(f \pm g)'(x) = f'(x) \pm g'(x)$

$(f\,g)'(x) = f'(x)\,g(x) + f(x)\,g'(x)$

$\left(\dfrac{f}{g}\right)'(x) = \dfrac{f'(x)\,g(x) - f(x)\,g'(x)}{g^2(x)}$

$(x^a)' = a\,x^{a-1}$

$(a^x)' = a^x \ln a$

$\log_a' x = \dfrac{1}{x \ln a}$

$(e^x)' = e^x$

$(\ln x)' = \dfrac{1}{x}$

$\mathrm{sen}' x = \cos x$

$\cos' x = -\,\mathrm{sen}\, x$

$\mathrm{tg}' x = \dfrac{1}{\cos^2 x}$

$\mathrm{cotg}' x = -\dfrac{1}{\mathrm{sen}^2 x}$

$\mathrm{sh}' x = \mathrm{ch} x$

$\mathrm{ch}' x = \mathrm{sh} x$

$\mathrm{th}' x = \dfrac{1}{\mathrm{ch}^2 x}$

$\mathrm{coth}' x = -\dfrac{1}{\mathrm{sh}^2 x}$

$\mathrm{arcsen}' x = \dfrac{1}{\sqrt{1-x^2}}$

$\arccos' x = \dfrac{-1}{\sqrt{1-x^2}}$

$\mathrm{arctg}' x = \dfrac{1}{1+x^2}$

$\mathrm{arccotg}' x = \dfrac{-1}{1+x^2}$

$\mathrm{argsh}' x = \dfrac{1}{\sqrt{1+x^2}}$

$\mathrm{argch}' x = \dfrac{1}{\sqrt{x^2-1}}$

$\mathrm{argth}' x = \dfrac{1}{1-x^2}$

$\mathrm{argcoth}' x = \dfrac{1}{1-x^2}$

$(g \circ u)'(x) = g'(u(x))\,u'(x)$

$(f^{-1})'(y) = \dfrac{1}{f'(f^{-1}(y))}$

Cálculo

Primitivas Imediatas

($u\colon I \longrightarrow \mathbb{R}$ é uma função derivável num intervalo I e $\mathcal{C}$ denota uma constante real arbitrária)

$$\int a\,dx = ax + \mathcal{C}$$

$$\int \frac{u'}{u}\,dx = \ln|u| + \mathcal{C}$$

$$\int u' \cos u\,dx = \operatorname{sen} u + \mathcal{C}$$

$$\int u' \operatorname{tg} u\,dx = -\ln|\cos u| + \mathcal{C}$$

$$\int \frac{u'}{\cos^2 u}\,dx = \operatorname{tg} u + \mathcal{C}$$

$$\int \frac{u'}{\cos u}\,dx = \ln\left|\frac{1}{\cos u} + \operatorname{tg} u\right| + \mathcal{C}$$

$$\int \frac{u'}{\sqrt{1-u^2}}\,dx = \operatorname{arcsen} u + \mathcal{C}$$

$$\int \frac{u'}{1+u^2}\,dx = \operatorname{arctg} u + \mathcal{C}$$

$$\int u' \operatorname{ch} u\,dx = \operatorname{sh} u + \mathcal{C}$$

$$\int u' \operatorname{th} u\,dx = \ln(\operatorname{ch} u) + \mathcal{C}$$

$$\int \frac{u'}{\operatorname{ch}^2 u}\,dx = \operatorname{th} u + \mathcal{C}$$

$$\int \frac{u'}{\sqrt{u^2+1}}\,dx = \operatorname{argsh} u + \mathcal{C}$$

$$\int \frac{u'}{1-u^2}\,dx = \operatorname{argth} u + \mathcal{C}$$

$$\int u'\, u^\alpha\,dx = \frac{u^{\alpha+1}}{\alpha+1} + \mathcal{C} \quad (\alpha \neq -1)$$

$$\int u'\, a^u\,dx = \frac{a^u}{\ln a} + \mathcal{C} \quad (a \in \mathbb{R}^+ \setminus \{1\})$$

$$\int u' \operatorname{sen} u\,dx = -\cos u + \mathcal{C}$$

$$\int u' \operatorname{cotg} u\,dx = \ln|\operatorname{sen} u| + \mathcal{C}$$

$$\int \frac{u'}{\operatorname{sen}^2 u}\,dx = -\operatorname{cotg} u + \mathcal{C}$$

$$\int \frac{u'}{\operatorname{sen} u}\,dx = \ln\left|\frac{1}{\operatorname{sen} u} - \operatorname{cotg} u\right| + \mathcal{C}$$

$$\int \frac{-u'}{\sqrt{1-u^2}}\,dx = \arccos u + \mathcal{C}$$

$$\int \frac{-u'}{1+u^2}\,dx = \operatorname{arccotg} u + \mathcal{C}$$

$$\int u' \operatorname{sh} u\,dx = \operatorname{ch} u + \mathcal{C}$$

$$\int u' \operatorname{coth} u\,dx = \ln(\operatorname{sh} u) + \mathcal{C}$$

$$\int \frac{u'}{\operatorname{sh}^2 u}\,dx = -\operatorname{coth} u + \mathcal{C}$$

$$\int \frac{u'}{\sqrt{u^2-1}}\,dx = \operatorname{argch} u + \mathcal{C}$$

$$\int \frac{u'}{1-u^2}\,dx = \operatorname{argcoth} u + \mathcal{C}$$