Séries de Taylor de Funções de uma variável real

$$f(x)=\sum_{n=0}^{+\infty}\frac{1}{n!}f^{(n)}(c)(x-c)^n$$

Resto de Lagrange $R_n(x)=\dfrac{(x-c)^{n+1}}{(n+1)!}f^{(n+1)}(\xi)$

Desenvolvimentos em série de funções trigonométricas

$\operatorname{sen} x = x-\frac{1}{3!}x^3+\frac{1}{5!}x^5-\frac{1}{7!}x^7+\frac{1}{9!}x^9-\frac{1}{11!}x^{11}+\cdots$ $\qquad x\in\mathbb{R}$

$\cos x = 1-\frac{1}{2!}x^2+\frac{1}{4!}x^4-\frac{1}{6!}x^6+\frac{1}{8!}x^8-\frac{1}{10!}x^{10}+\cdots$ $\qquad x\in\mathbb{R}$

$\operatorname{tg} x = x+\frac{1}{3}x^3+\frac{2}{15}x^5+\frac{17}{315}x^7+\frac{62}{2835}x^9+\frac{1382}{155\,925}x^{11}+\cdots$ $\qquad |x|<\dfrac{\pi}{2}$

$\cot x = \frac{1}{x}-\frac{1}{3}x-\frac{1}{45}x^3-\frac{2}{945}x^5-\frac{1}{4725}x^7-\frac{2}{93\,555}x^9+\cdots$ $\qquad 0<|x|<\pi$

$\sec x = 1+\frac{1}{2}x^2+\frac{5}{24}x^4+\frac{61}{720}x^6+\frac{277}{8064}x^8+\frac{50\,521}{3628\,800}x^{10}+\cdots$ $\qquad |x|<\dfrac{\pi}{2}$

$\operatorname{cosec} x = \frac{1}{x}+\frac{1}{6}x+\frac{7}{360}x^3+\frac{31}{15\,120}x^5+\frac{127}{604\,800}x^7+\cdots$ $\qquad 0<|x|<\pi$

$\operatorname{arcsen} x = x+\frac{1}{6}x^3+\frac{3}{40}x^5+\frac{5}{112}x^7+\frac{35}{1152}x^9+\frac{63}{2816}x^{11}+\cdots$ $\qquad |x|<1$

$\arccos x = \frac{\pi}{2}-x-\frac{1}{6}x^3-\frac{3}{40}x^5-\frac{5}{112}x^7-\frac{35}{1152}x^9-\frac{63}{2816}x^{11}\cdots$ $\qquad |x|<1$

$\operatorname{arctg} x = x-\frac{1}{3}x^3+\frac{1}{5}x^5-\frac{1}{7}x^7+\frac{1}{9}x^9-\frac{1}{11}x^{11}+\cdots$ $\qquad |x|\le 1$

Desenvolvimentos em série de funções hiperbólicas

$\operatorname{sh}\ x = x+\frac{1}{3!}x^3+\frac{1}{5!}x^5+\frac{1}{7!}x^7+\frac{1}{9!}x^9+\frac{1}{11!}x^{11}+\frac{1}{13!}x^{13}+\cdots$ $\qquad x\in\mathbb{R}$

$\operatorname{ch}\ x = 1+\frac{1}{2!}x^2+\frac{1}{4!}x^4+\frac{1}{6!}x^6+\frac{1}{8!}x^8+\frac{1}{10!}x^{10}+\frac{1}{12!}x^{12}+\cdots$ $\qquad x\in\mathbb{R}$

$\operatorname{th}\ x = x-\frac{1}{3}x^3+\frac{2}{15}x^5-\frac{17}{315}x^7+\frac{62}{2835}x^9-\frac{1382}{155\,925}x^{11}+\cdots$ $\qquad |x|<\dfrac{\pi}{2}$

$\coth x = \dfrac{1}{x}+\frac{1}{3}x-\frac{1}{45}x^3+\frac{2}{945}x^5-\frac{1}{4725}x^7+\frac{2}{93\,555}x^9+\cdots$ $\qquad 0<|x|<\pi$

Desenvolvimentos em série de funções exponenciais e logarítmicas

$e^x = 1+x+\frac{1}{2!}x^2+\frac{1}{3!}x^3+\frac{1}{4!}x^4+\frac{1}{5!}x^5+\frac{1}{6!}x^6+\frac{1}{7!}x^7+\cdots$ $\qquad x\in\mathbb{R}$

$\ln(1+x) = x-\frac{1}{2}x^2+\frac{1}{3}x^3-\frac{1}{4}x^4+\frac{1}{5}x^5-\frac{1}{6}x^6+\frac{1}{7}x^7+\cdots$ $\qquad -1<x\le -1$

$\dfrac{1}{2}\ln\left(\frac{1+x}{1-x}\right) = x+\frac{1}{3}x^3+\frac{1}{5}x^5+\frac{1}{7}x^7+\frac{1}{9}x^9+\frac{1}{11}x^{11}+\cdots$ $\qquad |x|<1$

Séries Variadas

$(1+x)^r = 1+rx+\dfrac{r(r-1)}{2!}x^2+\dfrac{r(r-1)(r-2)}{3!}x^3+\cdots$ $\qquad |x|<1,\ r\in\mathbb{R}$

$\dfrac{1}{1-x} = 1+x+x^2+x^3+\cdots$ $\qquad |x|<1$

$e^{\sin x} = 1+x+\frac{1}{2}x^2-\frac{1}{8}x^4-\frac{1}{15}x^5-\frac{1}{240}x^6+\frac{1}{90}x^7+\cdots$ $\qquad x\in\mathbb{R}$

Fórmula de Taylor para funções com duas variáveis

$$f(x_0+h,y_0+k)=f(x_0,y_0)+\left(\frac{\partial f}{\partial x}(x_0,y_0)h+\frac{\partial f}{\partial y}(x_0,y_0)k\right)+\frac{1}{2!}\left(\frac{\partial^2 f}{\partial x^2}(x_0,y_0)h^2+2\frac{\partial^2 f}{\partial x\partial y}(x_0,y_0)hk+\frac{\partial^2 f}{\partial y^2}(x_0,y_0)k^2\right)+$$

$$+\cdots+\frac{1}{n!}\sum_{p=0}^{n}\binom{n}{p}\frac{\partial^n f}{\partial x^{n-p}\partial y^p}(x_0,y_0)h^{n-p}k^p+\cdots$$

onde $\binom{n}{p}=\frac{n!}{p!(n-p)!}$