Développements en série entière usuels

$$e^{ax} = \sum_{n=0}^{\infty} \frac{a^n}{n!}\, x^n \qquad a \in \mathbb{C},\ x \in \mathbb{R}$$

$$\operatorname{sh} x = \sum_{n=0}^{\infty} \frac{1}{(2n+1)!}\, x^{2n+1} \qquad x \in \mathbb{R}$$

$$\operatorname{ch} x = \sum_{n=0}^{\infty} \frac{1}{(2n)!}\, x^{2n} \qquad x \in \mathbb{R}$$

$$\sin x = \sum_{n=0}^{\infty} \frac{(-1)^n}{(2n+1)!}\, x^{2n+1} \qquad x \in \mathbb{R}$$

$$\cos x = \sum_{n=0}^{\infty} \frac{(-1)^n}{(2n)!}\, x^{2n} \qquad x \in \mathbb{R}$$

$$(1+x)^\alpha = 1 + \sum_{n=1}^{\infty} \frac{\alpha(\alpha-1)\cdots(\alpha-n+1)}{n!}\, x^n \qquad (\alpha \in \mathbb{R}) \qquad x \in \left]-1\,;1\right[$$

$$\frac{1}{a-x} = \sum_{n=0}^{\infty} \frac{1}{a^{n+1}}\, x^n \qquad (a \in \mathbb{C}^*) \qquad x \in \left]-|a|\,;|a|\right[$$

$$\frac{1}{(a-x)^2} = \sum_{n=0}^{\infty} \frac{n+1}{a^{n+2}}\, x^n \qquad (a \in \mathbb{C}^*) \qquad x \in \left]-|a|\,;|a|\right[$$

$$\frac{1}{(a-x)^k} = \sum_{n=0}^{\infty} \frac{\mathrm{C}_{n+k-1}^{k-1}}{a^{n+k}}\, x^n \qquad (a \in \mathbb{C}^*) \qquad x \in \left]-|a|\,;|a|\right[$$

$$\ln(1-x) = -\sum_{n=1}^{\infty} \frac{1}{n}\, x^n \qquad x \in \left[-1\,;1\right[$$

$$\ln(1+x) = \sum_{n=1}^{\infty} \frac{(-1)^{n-1}}{n}\, x^n \qquad x \in \left]-1\,;1\right]$$

$$\sqrt{1+x} = 1 + \frac{x}{2} + \sum_{n=2}^{\infty} (-1)^{n-1} \frac{1 \times 3 \times \cdots \times (2n-3)}{2 \times 4 \times \cdots \times (2n)}\, x^n \qquad x \in \left]-1\,;1\right[$$

$$\frac{1}{\sqrt{1+x}} = 1 + \sum_{n=1}^{\infty} (-1)^n \frac{1 \times 3 \times \cdots \times (2n-1)}{2 \times 4 \times \cdots \times (2n)}\, x^n \qquad x \in \left]-1\,;1\right[$$

$$\operatorname{Arctan} x = \sum_{n=0}^{\infty} \frac{(-1)^n}{2n+1}\, x^{2n+1} \qquad x \in \left[-1\,;1\right]$$

$$\operatorname{Argth} x = \sum_{n=0}^{\infty} \frac{1}{2n+1}\, x^{2n+1} \qquad x \in \left]-1\,;1\right[$$

$$\operatorname{Arcsin} x = x + \sum_{n=1}^{\infty} \frac{1 \times 3 \times \cdots \times (2n-1)}{2 \times 4 \times \cdots \times (2n)}\ \frac{x^{2n+1}}{2n+1} \qquad x \in \left]-1\,;1\right[$$

$$\operatorname{Argsh} x = x + \sum_{n=1}^{\infty} (-1)^n \frac{1 \times 3 \times \cdots \times (2n-1)}{2 \times 4 \times \cdots \times (2n)}\ \frac{x^{2n+1}}{2n+1} \qquad x \in \left]-1\,;1\right[$$