

Some important power series

$$\frac{1}{1-z} = \sum_{n=0}^{\infty} z^n \text{ for } |z| < 1$$

$$e^z = \sum_{n=0}^{\infty} \frac{z^n}{n!} \text{ for } z \in \mathbb{C}$$

$$\cos z = \frac{e^{iz} + e^{-iz}}{2} = \sum_{n=0}^{\infty} \frac{(-1)^n}{(2n)!} z^{2n} \text{ for } z \in \mathbb{C}$$

$$\sin z = \frac{e^{iz} - e^{-iz}}{2i} = \sum_{n=0}^{\infty} \frac{(-1)^n}{(2n+1)!} z^{2n+1} \text{ for } z \in \mathbb{C}$$

$$\cosh z = \frac{e^z + e^{-z}}{2} = \sum_{n=0}^{\infty} \frac{1}{(2n)!} z^{2n} \text{ for } z \in \mathbb{C}$$

$$\sinh z = \frac{e^z - e^{-z}}{2} = \sum_{n=0}^{\infty} \frac{1}{(2n+1)!} z^{2n+1} \text{ for } z \in \mathbb{C}$$

$$\log(1+z) = \sum_{n=1}^{\infty} \frac{(-1)^{n-1}}{n} z^n \text{ for } |z| < 1$$

$$\arctan z = \sum_{n=0}^{\infty} \frac{(-1)^n}{2n+1} z^{2n+1} \text{ for } |z| < 1$$

$$\arcsin z = \sum_{n=0}^{\infty} \frac{1 \cdot 3 \cdot 5 \cdots (2n-1)}{2 \cdot 4 \cdot 6 \cdots 2n} z^{2n+1} \text{ for } |z| < 1$$