Développements Limités Usuels

$$e^x = 1 + x + \frac{x^2}{2!} + \frac{x^3}{3!} + \cdots + \frac{x^n}{n!} + o(x^n)$$

$$(1+x)^a = 1+ax+\frac{a(a-1)}{2!}x^2+\frac{a(a-1)(a-2)}{3!}x^3+\cdots+\frac{a(a-1)(a-2)...(a-n+1)}{n!}x^n+o(x^n)$$

$$\ln(1+x) = x - \frac{x^2}{2} + \frac{x^3}{3} - \cdots + (-1)^n\frac{x^{n+1}}{n+1} + o(x^{n+1})$$

$$\sin(x) = x - \frac{x^3}{3!} + \frac{x^5}{5!} - \cdots + (-1)^n\frac{x^{2n+1}}{(2n+1)!} + o(x^{2n+2})$$

$$\cos(x) = 1 - \frac{x^2}{2!} + \frac{x^4}{4!} - \cdots + (-1)^n\frac{x^{2n}}{(2n)!} + o(x^{2n+1})$$

$$\ln(1-x) = -x - \frac{x^2}{2} - \frac{x^3}{3} - \cdots - \frac{x^{n+1}}{n+1} + o(x^{n+1})$$

$$\frac{1}{1-x} = 1 + x + x^2 + x^3 + \cdots + x^n + o(x^n)$$

$$\frac{1}{1+x} = 1 - x + x^2 - x^3 + \cdots + (-1)^n x^n + o(x^n)$$

$$\tan(x) = x + \frac{x^3}{3} + \frac{2x^5}{15} + \frac{17x^7}{315} + \cdots + \frac{B_{2n}(-4)^n(1-4^n)}{(2n)!}x^{2n-1} + o(x^{2n})$$

$$\mathrm{ch}(x) = 1 + \frac{x^2}{2!} + \frac{x^4}{4!} + \cdots + \frac{x^{2n}}{(2n)!} + o(x^{2n+1})$$

$$\mathrm{sh}(x) = x + \frac{x^3}{3!} + \frac{x^5}{5!} + \cdots + \frac{x^{2n+1}}{(2n+1)!} + o(x^{2n+2})$$

$$\mathrm{th}(x) = x - \frac{x^3}{3} + \frac{2x^5}{15} + o(x^5)$$

$$\mathrm{Arcsin}(x) = x + \frac{x^3}{2\cdot 3} + \frac{1\cdot 3\cdot x^5}{2\cdot 4\cdot 5} + \cdots + \frac{1\cdot 3\cdot 5\cdots(2n-1)x^{2n+1}}{2\cdot 4\cdot 6\cdots(2n)\cdot(2n+1)} + o(x^{2n+2})$$

$$\mathrm{Arccos}(x) = \frac{\pi}{2} - x - \frac{x^3}{2\cdot 3} - \frac{1\cdot 3\cdot x^5}{2\cdot 4\cdot 5} - \cdots - \frac{1\cdot 3\cdot 5\cdots(2n-1)x^{2n+1}}{2\cdot 4\cdot 6\cdots(2n)\cdot(2n+1)} + o(x^{2n+2})$$

$$\mathrm{Argsh}(x) = x - \frac{x^3}{2\cdot 3} - \cdots + (-1)^n \frac{1\cdot 3\cdot 5\cdots(2n-1)x^{2n+1}}{2\cdot 4\cdot 6\cdots(2n)\cdot(2n+1)} + o(x^{2n+2})$$

$$\mathrm{Arctan}(x) = x - \frac{x^3}{3} + \frac{x^5}{5} - \cdots + (-1)^n \frac{x^{2n+1}}{2n+1} + o(x^{2n+2})$$

$$\mathrm{Argth}(x) = x + \frac{x^3}{3} + \cdots + \frac{x^{2n+1}}{2n+1} + o(x^{2n+2})$$