

Développements limités usuels

$$e^x = 1 + x + \frac{x^2}{2!} + \dots + \frac{x^n}{n!} + x^n \varepsilon(x) \quad \text{avec} \quad \lim_{x \rightarrow 0} \varepsilon(x) = 0$$

$$\operatorname{ch} x = 1 + \frac{x^2}{2!} + \frac{x^4}{4!} + \dots + \frac{x^{2n}}{(2n)!} + x^{2n} \varepsilon(x) \quad \text{avec} \quad \lim_{x \rightarrow 0} \varepsilon(x) = 0$$

$$\operatorname{sh} x = x + \frac{x^3}{3!} + \frac{x^5}{5!} + \dots + \frac{x^{2n+1}}{(2n+1)!} + x^{2n+1} \varepsilon(x) \quad \text{avec} \quad \lim_{x \rightarrow 0} \varepsilon(x) = 0$$

$$\cos x = 1 - \frac{x^2}{2!} + \frac{x^4}{4!} + \dots + \frac{(-1)^n x^{2n}}{(2n)!} + x^{2n} \varepsilon(x) \quad \text{avec} \quad \lim_{x \rightarrow 0} \varepsilon(x) = 0$$

$$\sin x = x - \frac{x^3}{3!} + \frac{x^5}{5!} + \dots + \frac{(-1)^n x^{2n+1}}{(2n+1)!} + x^{2n+1} \varepsilon(x) \quad \text{avec} \quad \lim_{x \rightarrow 0} \varepsilon(x) = 0$$

$$\tan x = x + \frac{x^3}{3} + \frac{2x^5}{15} + x^6 \varepsilon(x) \quad \text{avec} \quad \lim_{x \rightarrow 0} \varepsilon(x) = 0$$

$$\operatorname{th} x = x - \frac{x^3}{3} + \frac{2x^5}{15} + x^6 \varepsilon(x) \quad \text{avec} \quad \lim_{x \rightarrow 0} \varepsilon(x) = 0$$

$$(1+x)^m = 1 + mx + \frac{m(m-1)x^2}{2!} + \dots + \frac{m(m-1)(m-2)\dots(m-n+1)x^n}{n!} + x^n \varepsilon(x) \quad \text{avec} \quad \lim_{x \rightarrow 0} \varepsilon(x) = 0$$

$$\frac{1}{1-x} = 1 + x + x^2 + \dots + x^n + x^n \varepsilon(x) \quad \text{avec} \quad \lim_{x \rightarrow 0} \varepsilon(x) = 0$$

$$\frac{1}{1+x} = 1 - x + x^2 + \dots + (-1)^n x^n + x^n \varepsilon(x) \quad \text{avec} \quad \lim_{x \rightarrow 0} \varepsilon(x) = 0$$

$$\ln(1+x) = x - \frac{x^2}{2} + \frac{x^3}{3} + \dots + \frac{(-1)^{n-1} x^n}{n} + x^n \varepsilon(x) \quad \text{avec} \quad \lim_{x \rightarrow 0} \varepsilon(x) = 0$$

$$\arctan x = x - \frac{x^3}{3} + \frac{x^5}{5} + \dots + \frac{(-1)^n x^{2n+1}}{2n+1} + x^{2n+1} \varepsilon(x) \quad \text{avec} \quad \lim_{x \rightarrow 0} \varepsilon(x) = 0$$

$$\arcsin x = x + \frac{x^3}{6} + \frac{3x^5}{40} + \dots + \frac{1 \times 3 \times 5 \times \dots \times (2n-1)}{2 \times 4 \times 6 \times \dots \times 2n} \frac{x^{2n+1}}{2n+1} + x^{2n+1} \varepsilon(x) \quad \text{avec} \quad \lim_{x \rightarrow 0} \varepsilon(x) = 0$$

$$\operatorname{arg sh} x = x - \frac{x^3}{6} + \frac{3x^5}{40} + \dots + (-1)^n \frac{1 \times 3 \times 5 \times \dots \times (2n-1)}{2 \times 4 \times 6 \times \dots \times 2n} \frac{x^{2n+1}}{2n+1} + x^{2n+1} \varepsilon(x) \quad \text{avec} \quad \lim_{x \rightarrow 0} \varepsilon(x) = 0$$