Développements limités usuels

Développements limités classiques en 0. ($\alpha \in \mathbb{R}$).

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\begin{aligned}
e^x &= 1 + x + \frac{x^2}{2!} + \cdots + \frac{x^n}{n!} + o(x^n) \\
\cos x &= 1 - \frac{x^2}{2!} + \frac{x^4}{4!} + \cdots + (-1)^p \frac{x^{2p}}{(2p)!} + o(x^{2p+1}) \\
\sin x &= x - \frac{x^3}{3!} + \frac{x^5}{5!} + \cdots + (-1)^p \frac{x^{2p+1}}{(2p+1)!} + o(x^{2p+2}) \\
\tan x &= x + \frac{x^3}{3} + \frac{2x^5}{15} + \frac{17x^7}{315} + o(x^7) \\
\mathrm{ch}\ x &= 1 + \frac{x^2}{2!} + \frac{x^4}{4!} + \cdots + \frac{x^{2p}}{(2p)!} + o(x^{2p+1}) \\
\mathrm{sh}\ x &= x + \frac{x^3}{3!} + \frac{x^5}{5!} + \cdots + \frac{x^{2p+1}}{(2p+1)!} + o(x^{2p+2}) \\
\frac{1}{1-x} &= 1 + x + x^2 + \cdots + x^n + o(x^n) \\
\frac{1}{1+x} &= 1 - x + x^2 + \cdots + (-1)^n x^n + o(x^n) \\
\ln(1+x) &= x - \frac{x^2}{2} + \frac{x^3}{3} + \cdots + (-1)^{n+1} \frac{x^n}{n} + o(x^n) \\
(1+x)^\alpha &= 1 + \alpha x + \frac{\alpha(\alpha-1)}{2!} x^2 + \cdots + \frac{\alpha(\alpha-1)\ldots(\alpha-n+1)}{n!} x^n + o(x^n) \\
\sqrt{1+x} &= 1 + \frac{x}{2} - \frac{x^2}{8} + \cdots + (-1)^{n-1} \frac{(2n-2)!}{2^{2n-1}(n-1)!n!} x^n + o(x^n)
\end{aligned}
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