Maclaurin Series of Hyperbolic Functions

$$f(x) = f(0) + \frac{f'(0)}{1!}\cdot x + \frac{f^{(2)}(0)}{2!}\cdot x^2 + \frac{f^{(3)}(0)}{3!}\cdot x^3 + \cdots + \frac{f^{(n)}(0)}{n!}\cdot x^n + \cdots$$

$\sinh x = \frac{e^x - e^{-x}}{2}$	$\cosh x = \frac{e^x + e^{-x}}{2}$	$\tanh x = \frac{e^x - e^{-x}}{e^x + e^{-x}}$
$\sinh x = -i\sin ix$	$\cosh x = \cos ix$	$\tanh x = -i\tan ix$
$\mathrm{csch}x = \frac{1}{\sinh x}$	$\mathrm{sech}x = \frac{1}{\cosh x}$	$\coth x = \frac{1}{\tanh x}$
$\sinh^{-1} x = \ln\left(x + \sqrt{x^2+1}\right)$	$\cosh^{-1} x = \ln\left(x + \sqrt{x^2-1}\right)$	$\tanh^{-1} x = \frac{1}{2}\ln\left(\frac{1+x}{1-x}\right)$
$\cosh^2 x - \sinh^2 x = 1$	$1 - \tanh^2 x = \mathrm{sech}^2\, x$	$1 - \coth^2 x = -\mathrm{csch}^2\, x$
$\frac{d(\sinh x)}{dx} = \cosh x$	$\frac{d(\cosh x)}{dx} = \sinh x$	$\frac{d(\tanh x)}{dx} = \mathrm{sech}^2\, x$
$\frac{d(\mathrm{csch}\, x)}{dx} = -\mathrm{csch}\, x \coth x$	$\frac{d(\mathrm{sech}x)}{dx} = -\mathrm{sech}x \tanh x$	$\frac{d(\coth x)}{dx} = -\mathrm{csch}^2\, x$
$\frac{d(\sinh^{-1} x)}{dx} = \frac{1}{\sqrt{x^2+1}}$	$\frac{d(\cosh^{-1} x)}{dx} = \frac{1}{\sqrt{x^2-1}}$	$\frac{d(\tanh^{-1} x)}{dx} = \frac{1}{1-x^2}, \quad \lvert x\rvert < 1$
$\frac{d(\mathrm{csch}^{-1} x)}{dx} = -\frac{1}{\lvert x\rvert\sqrt{x^2+1}}$	$\frac{d(\mathrm{sech}^{-1} x)}{dx} = -\frac{1}{\lvert x\rvert\sqrt{1-x^2}}$	$\frac{d(cot\,\mathrm{h}^{-1} x)}{dx} = \frac{1}{1-x^2}, \quad \lvert x\rvert > 1$

First few terms of the Maclaurin Series	Maclaurin Series	Interval of Convergence
$\sinh x = x + \frac{x^3}{3!} + \frac{x^5}{5!} + \frac{x^7}{7!} \ldots + \frac{x^{2n+1}}{(2n+1)!} + \cdots$	$\sum_{n=0}^{\infty} \frac{x^{2n+1}}{(2n+1)!}$	All x
$\cosh x = 1 + \frac{x^2}{2!} + \frac{x^4}{4!} + \frac{x^6}{6!} \ldots + \frac{x^{2n}}{(2n)!} + \cdots$	$\sum_{n=0}^{\infty} \frac{x^{2n}}{(2n)!}$	All x
$\sinh^{-1} x = x - \frac{1}{2.3}x^3 + \frac{1\cdot 3}{2\cdot 4\cdot 5}x^5 - \frac{1\cdot 3\cdot 5}{2\cdot 4\cdot 6\cdot 7}x^7 + \cdots$	$x + \sum_{n=1}^{\infty} (-1)^n \frac{1\cdot 3\cdot 5\cdots(2n-1)x^{2n+1}}{2\cdot 4\cdot 6\cdots(2n)\cdot(2n+1)}$	$\lvert x\rvert < 1$
$\cosh^{-1} x = \ln(2x) - \frac{1}{2}\cdot\frac{1}{2x^2} - \frac{1\cdot 3}{2.4}\frac{1}{4x^4} + \cdots$		$\lvert x\rvert > 1$
$\tanh^{-1} x = x + \frac{x^3}{3} + \frac{x^5}{5} + \frac{x^7}{7} \ldots + \frac{x^{2n+1}}{2n+1} + \cdots$	$\sum_{n=0}^{\infty} \frac{x^{2n+1}}{(2n+1)}$	$\lvert x\rvert \le 1$
$\coth^{-1} x = \frac{1}{x} + \frac{1}{3x^3} + \frac{1}{5x^5} + \frac{1}{7x^7} \ldots + \frac{1}{(2n+1)x^{2n+1}} + \cdots$	$\sum_{n=0}^{\infty} \frac{x^{-(2n+1)}}{(2n+1)}$	$\lvert x\rvert > 1$
$\tanh x = x - \frac{1}{3}x^3 + \frac{2}{15}x^5 - \frac{17}{315}x^7 + \frac{62}{2835}x^9 + \cdots$		$\lvert x\rvert < \frac{\pi}{2}$
$\mathrm{csch}\,x = \frac{1}{x} - \frac{1}{6}x + \frac{7}{360}x^3 - \frac{31}{15120}x^5 + \frac{127}{604800}x^7 + \cdots$		$0 < \lvert x\rvert < \pi$
$\mathrm{sech}\,x = 1 - \frac{1}{2}x^2 + \frac{5}{24}x^4 - \frac{61}{720}x^6 + \frac{277}{8064}x^8 + \cdots$		$\lvert x\rvert < \frac{\pi}{2}$
$\coth x = \frac{1}{x} + \frac{1}{3}x - \frac{1}{45}x^3 + \frac{2}{945}x^5 - \frac{1}{4725}x^7 - \cdots$		$0 < \lvert x\rvert < \pi$
$\mathrm{sech}^{-1} x = \ln\frac{2}{x} - \frac{1}{2}\cdot\frac{x^2}{2} - \frac{1}{2}\cdot\frac{3}{4}\cdot\frac{x^4}{4} - \frac{1}{2}\cdot\frac{3}{4}\cdot\frac{5}{6}\cdot\frac{x^6}{6}\ldots$		$0 < x < 1$
$\mathrm{csch}^{-1} x = \ln\frac{2}{x} + \frac{1}{2}\cdot\frac{x^2}{2} + \frac{1}{2}\cdot\frac{3}{4}\cdot\frac{x^4}{4} + \frac{1}{2}\cdot\frac{3}{4}\cdot\frac{5}{6}\cdot\frac{x^6}{6}\ldots$		$0 < x < 1$
$\mathrm{csch}^{-1} x = \frac{1}{x} - \frac{1}{2}\cdot\frac{1}{3x^3} - \frac{1}{2}\cdot\frac{3}{4}\cdot\frac{1}{5x^5} - \frac{1}{2}\cdot\frac{3}{4}\cdot\frac{5}{6}\cdot\frac{1}{7x^7} + \cdots$		$\lvert x\rvert > 1$

$$(1+x)^p = 1 + p\cdot\frac{x}{1!} + \frac{p\cdot(p-1)}{2!}x^2 + \cdots + \frac{p(p-1)(p-2)\ldots(p-n+1)}{n!} + \cdots \qquad \lvert x\rvert < 1$$