$$\frac{1}{1-x} = \sum_{k=0}^{n} x^k + o_0(x^n)$$
$$= 1 + x + x^2 + \ldots + x^n + o_0(x^n)$$

$$\ln(1+x) = \sum_{k=1}^{n} (-1)^{k+1} \frac{x^k}{k} + o_0(x^n)$$
$$= x - \frac{x^2}{2} + \frac{x^3}{3} + \ldots + (-1)^{n+1}\frac{x^n}{n} + o_0(x^n)$$

$$(1+x)^\alpha = 1 + \sum_{k=1}^{n} \left(\prod_{i=0}^{k-1} (\alpha - i)\right) \frac{x^k}{k!} + o_0(x^n)$$
$$= 1 + \alpha x + \frac{\alpha(\alpha-1)}{2}x^2 + \frac{\alpha(\alpha-1)(\alpha-2)}{6}x^3 + \ldots + \frac{\alpha(\alpha-1)\ldots(\alpha-n+1)}{n!}x^n + o_0(x^n)$$

$$e^x = \sum_{k=0}^{n} \frac{x^k}{k!} + o_0(x^n)$$
$$= 1 + x + \frac{x^2}{2} + \ldots + \frac{x^n}{n!} + o_0(x^n)$$

$$\cos(x) = \sum_{k=0}^{n} (-1)^k \frac{x^{2k}}{(2k)!} + o_0(x^{2n+1})$$
$$= 1 - \frac{x^2}{2} + \frac{x^4}{24} + \ldots + (-1)^n \frac{x^{2n}}{(2n)!} + o_0(x^{2n+1})$$

$$\sin(x) = \sum_{k=0}^{n} (-1)^k \frac{x^{2k+1}}{(2k+1)!} + o_0(x^{2n+2})$$
$$= x - \frac{x^3}{6} + \frac{x^5}{120} + \ldots + (-1)^n \frac{x^{2n+1}}{(2n+1)!} + o_0(x^{2n+2})$$

$$\mathrm{ch}(x) = \sum_{k=0}^{n} \frac{x^{2k}}{(2k)!} + o_0(x^{2n+1})$$
$$= 1 + \frac{x^2}{2} + \frac{x^4}{24} + \ldots + \frac{x^{2n}}{(2n)!} + o_0(x^{2n+1})$$

$$\mathrm{sh}(x) = \sum_{k=0}^{n} \frac{x^{2k+1}}{(2k+1)!} + o_0(x^{2n+2})$$
$$= x + \frac{x^3}{6} + \frac{x^5}{120} + \ldots + \frac{x^{2n+1}}{(2n+1)!} + o_0(x^{2n+2})$$

$$\arctan(x) = \sum_{k=0}^{n} (-1)^k \frac{x^{2k+1}}{2k+1} + o_0(x^{2n+2})$$
$$= x - \frac{x^3}{3} + \ldots + (-1)^n \frac{x^{2n+1}}{2n+1} + o_0(x^{2n+2})$$

$$\tan(x) = x + \frac{x^3}{3} + o_0(x^3)$$