

I need to develop a power series of $\ln(1+x/1-x)$

Using the result, calculate with the first four exact decimals the number $\ln 2$.

$$\begin{aligned}\ln\left(1 + \frac{x}{1-x}\right) &= \ln\left(\frac{1}{1-x}\right) = \ln(1) - \ln(1-x) = -\ln(1-x) = -\sum_{n=1}^{\infty} \frac{(-1)^{n+1}}{n} (-x)^n \\ &= \sum_{n=1}^{\infty} \frac{(-1)^{n+1}}{n} (-1)^{n+1} (x)^n = \sum_{n=1}^{\infty} \frac{(x)^n}{n}\end{aligned}$$

$$\ln 2 = \ln\left(1 + \frac{\frac{1}{2}}{1 - \frac{1}{2}}\right) = \frac{1}{2} + \frac{1}{8} + \frac{1}{24} + \frac{1}{64} + \frac{1}{160} + \frac{1}{384} + \frac{1}{896} + \frac{1}{1984} = 0.6931$$