

Numerical Computing :: Sample Project

The series expansion of $f(x) = \exp(x)$ in a monomial basis is

$$\exp(x) = 1 + x + \frac{x^2}{2} + \frac{x^3}{6} + \dots = \sum_{k=0}^{\infty} \frac{x^k}{k!} \quad (1)$$

It's possible to approximate $\exp(x)$ by truncating the series to $n < \infty$ terms,

$$f(x) \approx f_n(x) = 1 + x + \dots + \frac{x^n}{n!} \quad (2)$$

How does the approximation accuracy depend on the truncation n ? Does the accuracy depend on n differently at different values of x ?