

# Exponential-function

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## 1 Introduction

The exponential function is a mathematical function denoted by  $f(x) = \exp(x)$  or  $e^x$ . The formal definition of the exponential function is:

$$\exp x := \sum_{k=0}^{\infty} \frac{x^k}{k!} = 1 + x + \frac{x^2}{2} + \frac{x^3}{6} + \frac{x^4}{24} + \cdots \quad (1)$$

This is an infinite sum. Here we approximate the exponential function by:

$$\exp x \approx 1 + x * \left(1 + \frac{x}{2} * \left(1 + \frac{x}{3} * \left(1 + \frac{x}{4} * \left(1 + \frac{x}{5} * \left(1 + \frac{x}{6} * \left(1 + \frac{x}{7} * \left(1 + \frac{x}{8} * \left(1 + \frac{x}{9} * \left(1 + \frac{x}{10}\right)\right)\right)\right)\right)\right)\right)\right)\right)\right) \quad (2)$$

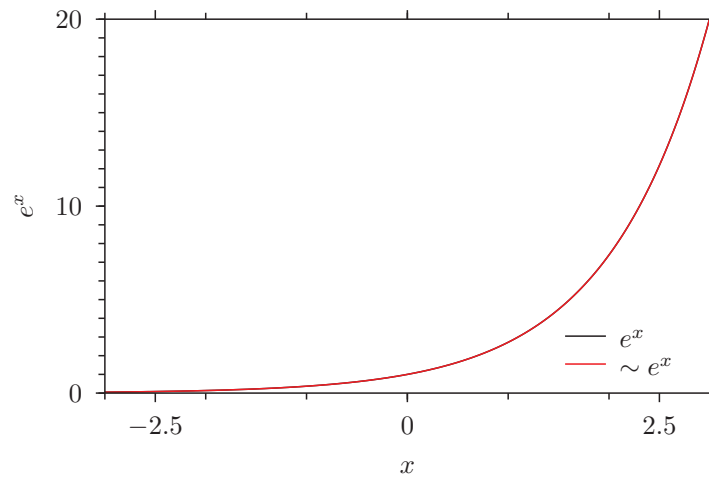


Figure 1: The exponential function. The black line is the exponential function using the System.Math and the red line is the approximate exponential function found from equation (2)