3.5.1   Example: Taylor expansion of exponential function
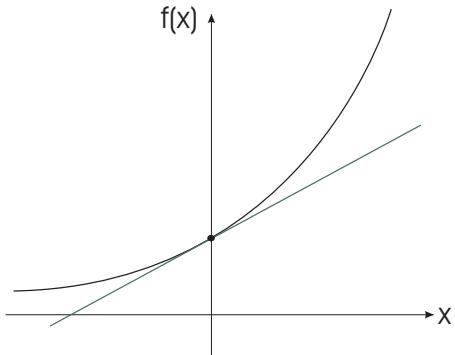
$$f(x) \quad = \quad e^x, \qquad x_0 = 0$$

$$f(x) \quad \approx \quad e^0 + \frac{1}{1!}(x-0)f'(0) = 1 + x$$

$$x_0 \quad = \quad 1 \qquad f(x) \approx e^1 + (x-1)e^1 = ex$$

$$x_0 \quad = \quad -1 \qquad f(x) \approx e^{-1} + (x-(-1))e^{-1} = \frac{1}{e}x + \frac{2}{e}$$

$$\rightarrow \quad f(x) = \sum_{n=0}^{\infty} \frac{1}{n!}x^n$$