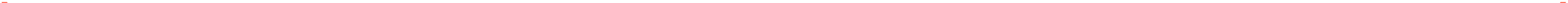
Taylor's theorem



Taylor polynomial of degree n

Taylor's theorem

A function $f(x)$ can be expressed as a sum of terms derived from its derivatives at a specific point, plus a remainder term. Mathematically, the theorem can be written as:

$$f(x) = \underbrace{f(a) + f'(a)(x-a) + \frac{f''(a)}{2!}(x-a)^2 + \cdots + \frac{f^{(n)}(a)}{n!}(x-a)^n}_{\text{Taylor polynomial of degree } n} + R_n(x)$$

where

a is the point around which the function is approximated

n is the order of the polynomial approximation

$R_n(x)$ is the remainder term, representing the error in the approximation after n terms.

Taylor approximation