

I.3 Numerical differentiation

We all know how to differentiate a function analytically...

However, sometimes there are reasons to do this numerically:

- very complicated function (error prone)
 - ... e.g. quasi-Newton methods \rightsquigarrow Chap. 2
- function not known analytically
 - ... e.g. numerical solution of differential equations \rightsquigarrow Chap. 3 & 4

Idea: Find IP $p[f|x_0, \dots, x_n]$ approx. the function $f(x)$ and compute

$$f(x) \approx p[f|x_0, \dots, x_n](x)$$

$$f'(x) \approx p'[f|x_0, \dots, x_n](x)$$

$$f''(x) \approx p''[f|x_0, \dots, x_n](x)$$

⋮