

Seminarie Numerieke Analyse 2020–2021

- 1) Consider the function

$$f(x) = \alpha_1 \exp(\phi_1 x) + \alpha_2 \exp(\phi_2 x).$$

Identify its symbolic expression from

$$\left\{ \begin{array}{l} f(0) = \alpha_1 + \alpha_2 \\ f'(0) = \alpha_1 \phi_1 + \alpha_2 \phi_2 \\ f''(0) = \alpha_1 \phi_1^2 + \alpha_2 \phi_2^2 \\ f'''(0) = \alpha_1 \phi_1^3 + \alpha_2 \phi_2^3 \\ f^{(4)}(0) = \alpha_1 \phi_1^4 + \alpha_2 \phi_2^4 \end{array} \right.$$

- 2) Consider the 4-term example function $\phi(x)$ given at the end of the slide presentation. Reverse engineer the values of $\alpha_i, \phi_i, i = 1, \dots, 4$ from f_0, \dots, f_{12} .
- 3) Now change the expression for $\phi(x)$ to

$$\phi(x) = 1 + 2 \exp((-0.2 + 39.5i)x) + 4 \exp((-0.5 + 40i)x) + 8 \exp(-x)$$

and repeat the above.