

Exercise Sheet 1

Exercise 1

Given two quantities x_1 and x_2 affected by numerical errors, estimate an upper limit to the error of the *product*

$$x = x_1 \cdot x_2 \quad .$$

Exercise 2

Given a numerically estimated quantity x , estimate the **relative** numerical error on

$$f(x) = \sqrt{x} \quad .$$

Exercise 3

Use the general error propagation formula for a function $f(x_1, x_2, \dots, x_n)$

$$\Delta f = \sum_{i=1}^n \left| \frac{\partial f}{\partial x_i} \Delta x_i \right| \quad .$$

for deriving the formula for the error of the ratio of two variables $f = x_1/x_2$ and show that the **relative** error is exactly the one calculated during the lecture with another method. Note that we consider the absolute value of the derivatives, since we would like to obtain an upper limit.