Lecture 3

<u>Finger exercise 1:</u>

Lets step together over the plotting notebook:

lecture_3/Finger_exercises/01_monte-carlo-integration.ipynb

Finger exercise 2:

Try to compute the following 1d-integral with Monte Carlo integration:

$$\int_0^\pi \sin x \, dx$$

Finger exercise 3:

We can also perform integration for multivariate functions. The procedure is the same as before. However, instead of sampling over a line (from a to b), we now need to sample over a higher-dimensional domain. For simplicity, we will illustrate the integration of a multivariate function over a domain with the same a and b for each variable. This means in a function with two variables (x1 and x2), the domain is square shaped (and for function with three variables, cube shaped).

Try to compute the following multi-variate functions Monte Carlo integration:

```
def func(x):
    # for 2D: f(x)= 10 - x1^2 - x2^2
    return 10 + np.sum(-1*np.power(x, 2), axis=1)
```