

Lab 02 - Monte-Carlo integration

- ▶ **Determine the value of π using Monte-Carlo integration. Considering the value upto four decimal places as the correct value, determine the error as a function of number of Monte-Carlo steps.**
- ▶ **Determine the area of an ellipse with semi-major axis $a = 5$ cm and semi-minor axis $b = 2$ cm using (a) trapeziodal rule, (b) Simpson's rule, (c) Monte Carlo integration and compare the results with theoretical value using the value of π upto four decimal places.**

Lab 02 - Monte-Carlo integration

- ▶ Determine the volume of an ellipsoid with the axes $a = 5$ cm, $b = 10$ cm and $c = 15$ cm.
- ▶ Consider a set of n -dimensional unit spheres ($3 \leq n \leq 20$). The general equation for the spheres is given as:

$$x_1^2 + x_2^2 + \dots + x_n^2 = 1$$

Determine the volumes in each case. Plot the time requirement for volume calculation as a function of dimension of the sphere.