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# Advanced 3D computer graphics for movies and games (NPGR010)

## – Monte Carlo estimators – Labs

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# Construction of MC estimators

- Consider the function  $f(x) = \sin x$  on the interval  $[0, \pi/2]$ . Construct the primary MC estimator for the integral

$$I = \int_0^{\pi/2} f(x) dx$$

using samples from

- a) the uniform distribution on the interval  $[0, \pi/2]$
  - b) a linearly increasing distribution on the interval  $[0, \pi/2]$
- For both distributions, write down the respective pdf, the formula for the primary estimator, derive the expected value and the variance of the primary estimator. Which sample distribution leads to an estimator with less variance and why? Why is the lower-variance estimator advantageous in practice?