

MOD300 Anvendt Python programmering og modellering

Enrico Riccardi¹

Department of Mathematics and Physics, University of Stavanger (UiS).¹

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MC4pi

Calculate pi from a circle:
 $A = \pi * r^2$
How does it change as a function of the number of trials?

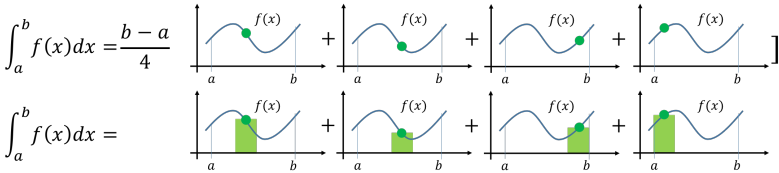
MC4all

Calculate the Area of any object:
 $A = N_{in}/N_{TOT} * A_{TOT}$
How does it change as a function of the number of trials?

Of any object

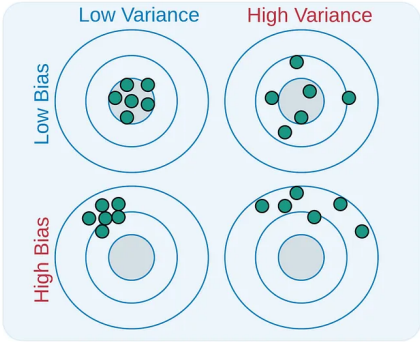
Calculate the area of this complex function
 $f = (x*x + y*y - 1)**3 - (x*x) * (y**3)$

MC integration



advanced MC method

Importance sampling



Bias and Variance?

Central limit theorem

The average of an independent random variable follows a normal distribution.

Skeptical? Try it yourself!? Make a histogram of the averages on different sets of random points. To make it easier, use only 0 and 1 values.

The birthday paradox

- Write a function that gives a random date (day and month).
- Make a function that takes as input the number of person in a group and return 1 if at least 2 people have the same bday, 0 if not.
- Make a function that calculate P of two people having the same bday. Determine how many people we need to have 50% probability for it.

MC Applications

Random walk