MOD300 Anvendt Python programmering og modellering

Enrico Riccardi[1]

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

06.10.2025

Recaps

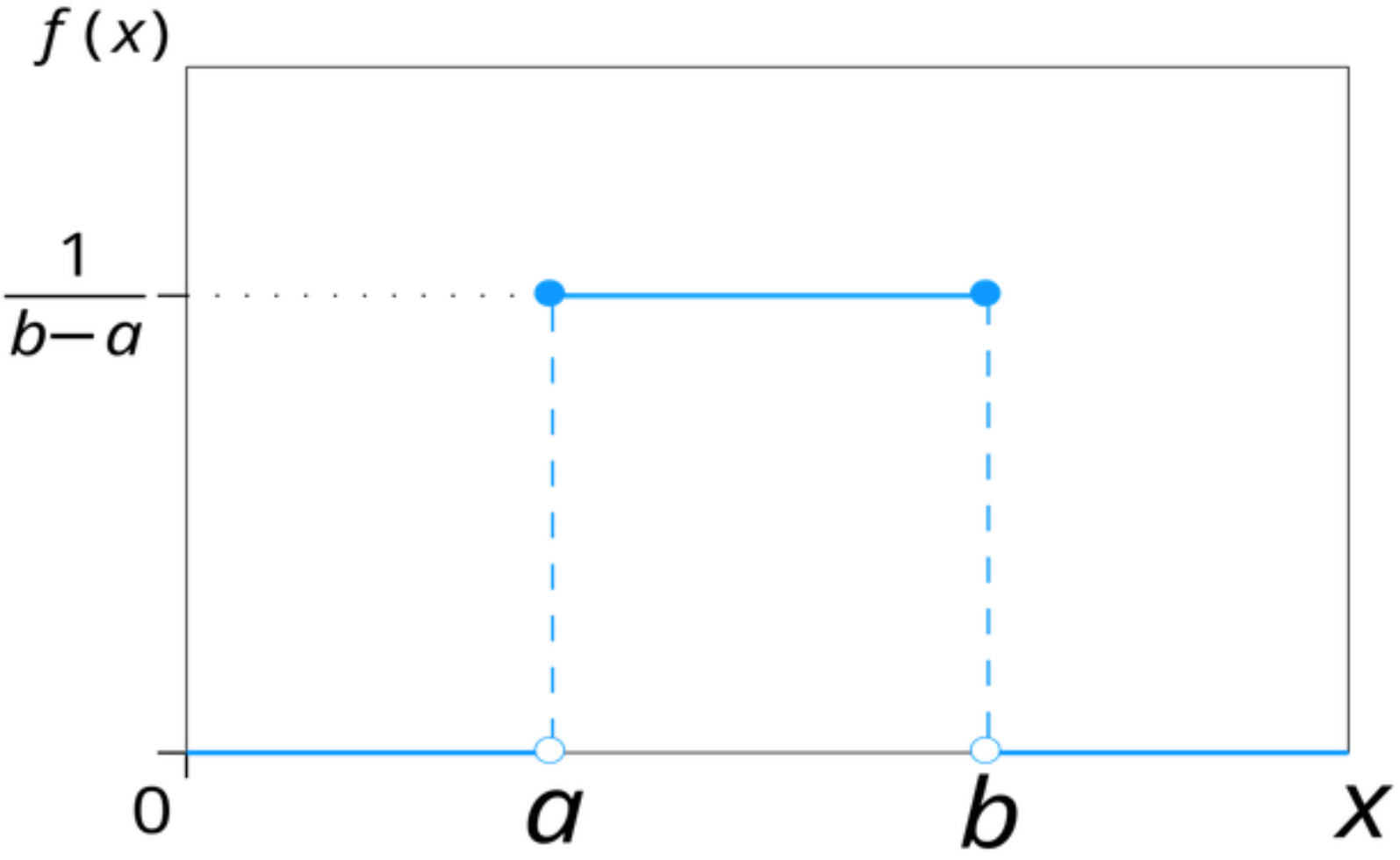
INFERENCE Probability distributions are a description of uncertainity (lack of knowledge).

DESCRIPTORS Probability distribution as description of a not-deterministic state (electrons moving).

Uniform distribution function

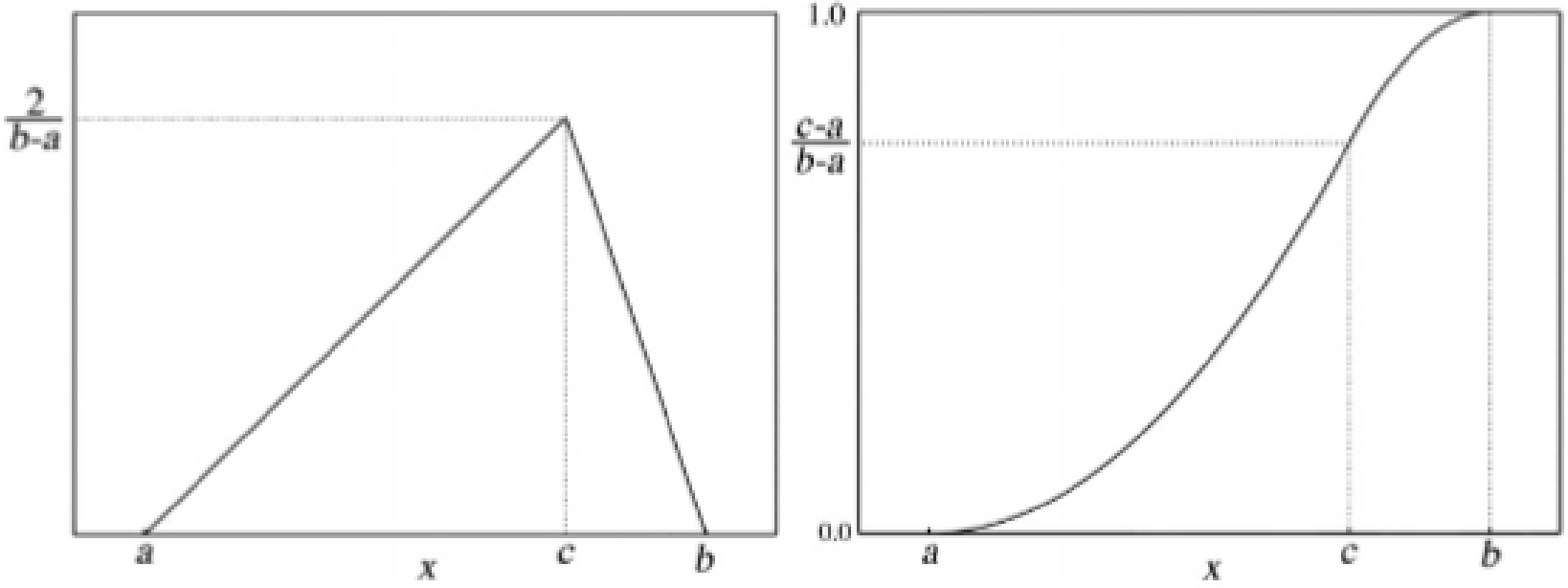
PDF: $f(x) =$

$\frac{1}{b-a}, a \leq x \leq b$



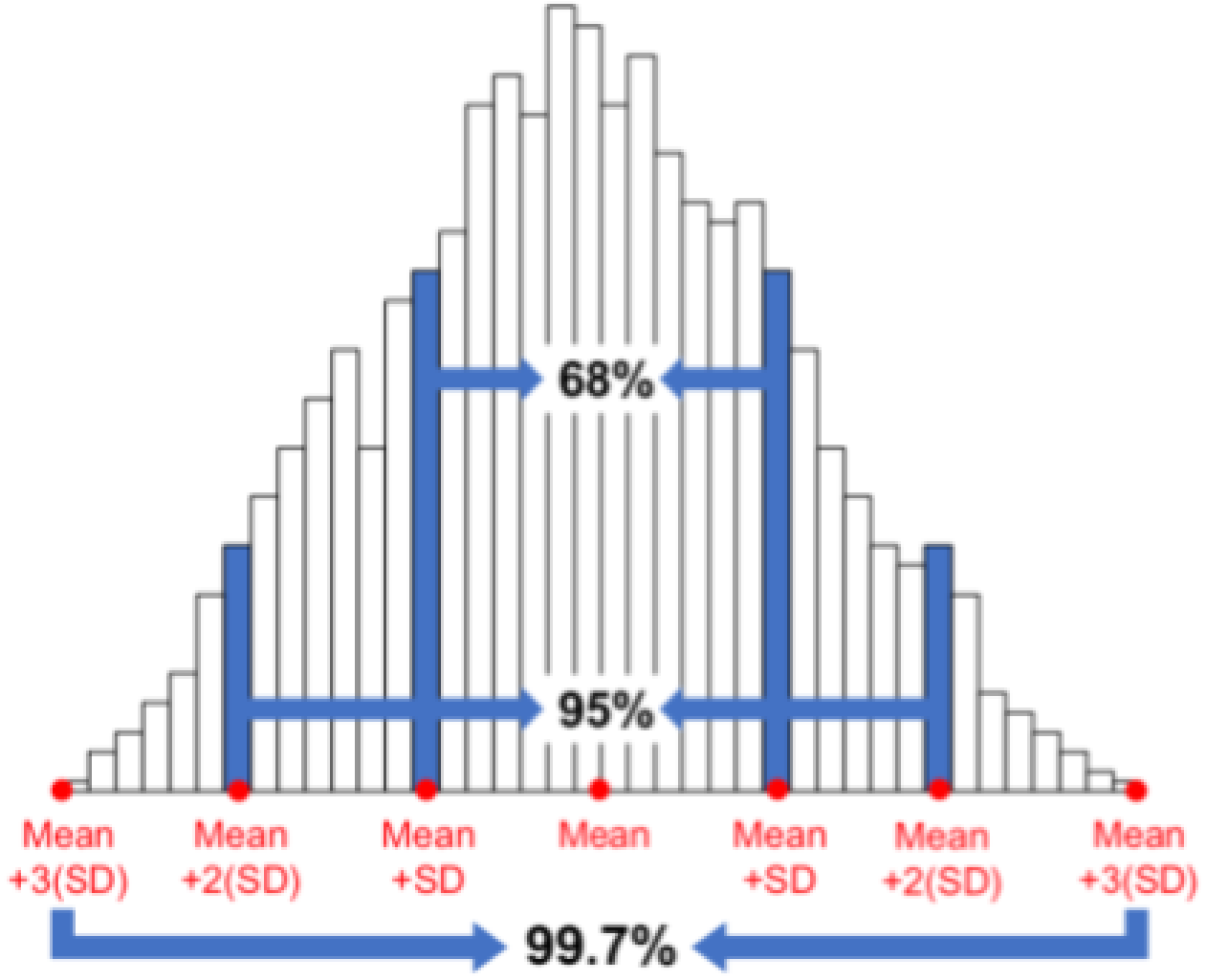
Triangular distribution function

Notation: $X \sim T(a, b, c)$

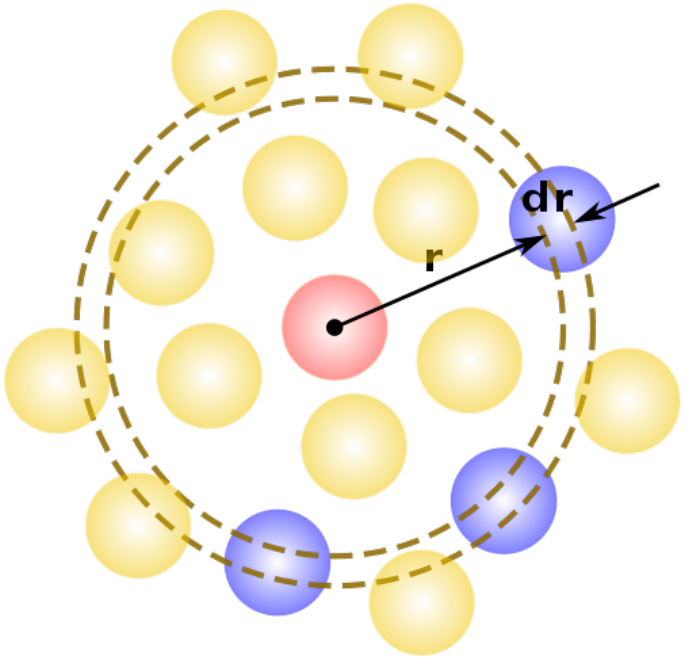


Normal Distribution

Notation: $X \sim G(\mu, \sigma)$



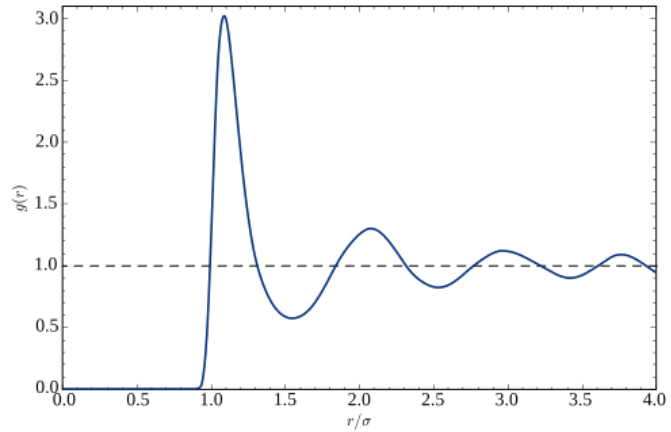
Radal distribution function



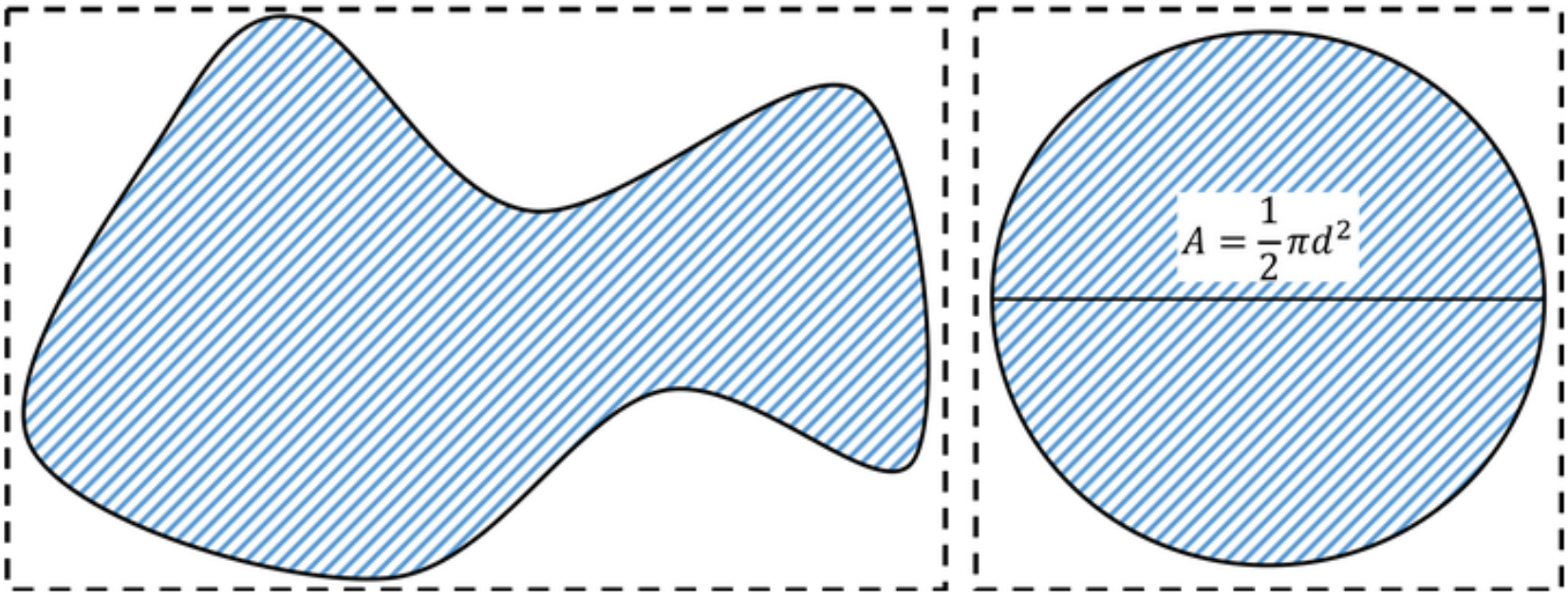
$$g(r) = \frac{dn_r}{4\pi r^2 dr \rho}$$

Radal distribution function

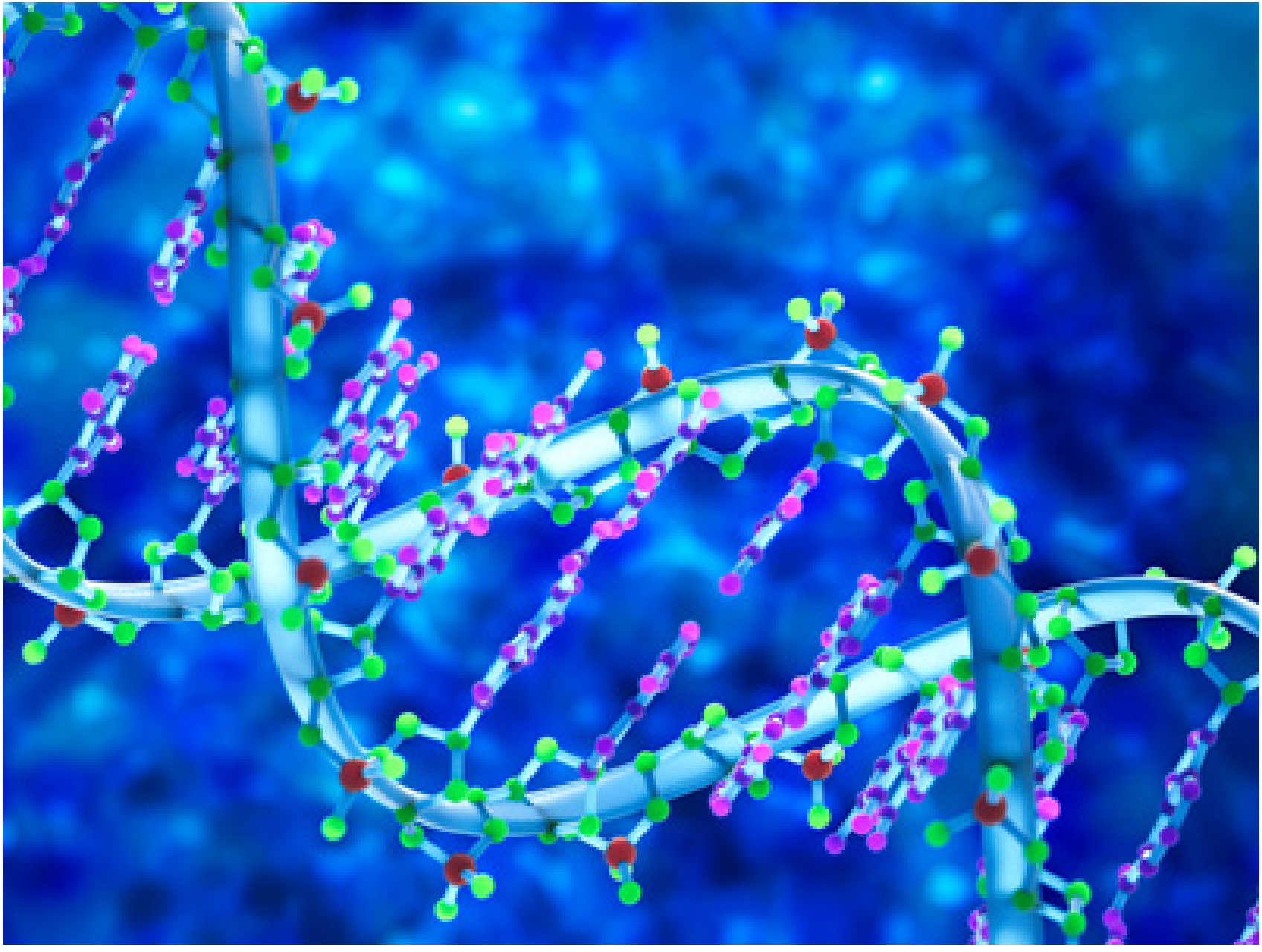
$$g(r) = \frac{dn_r}{4\pi r^2 dr \rho}$$



2D distributions



3D distributions

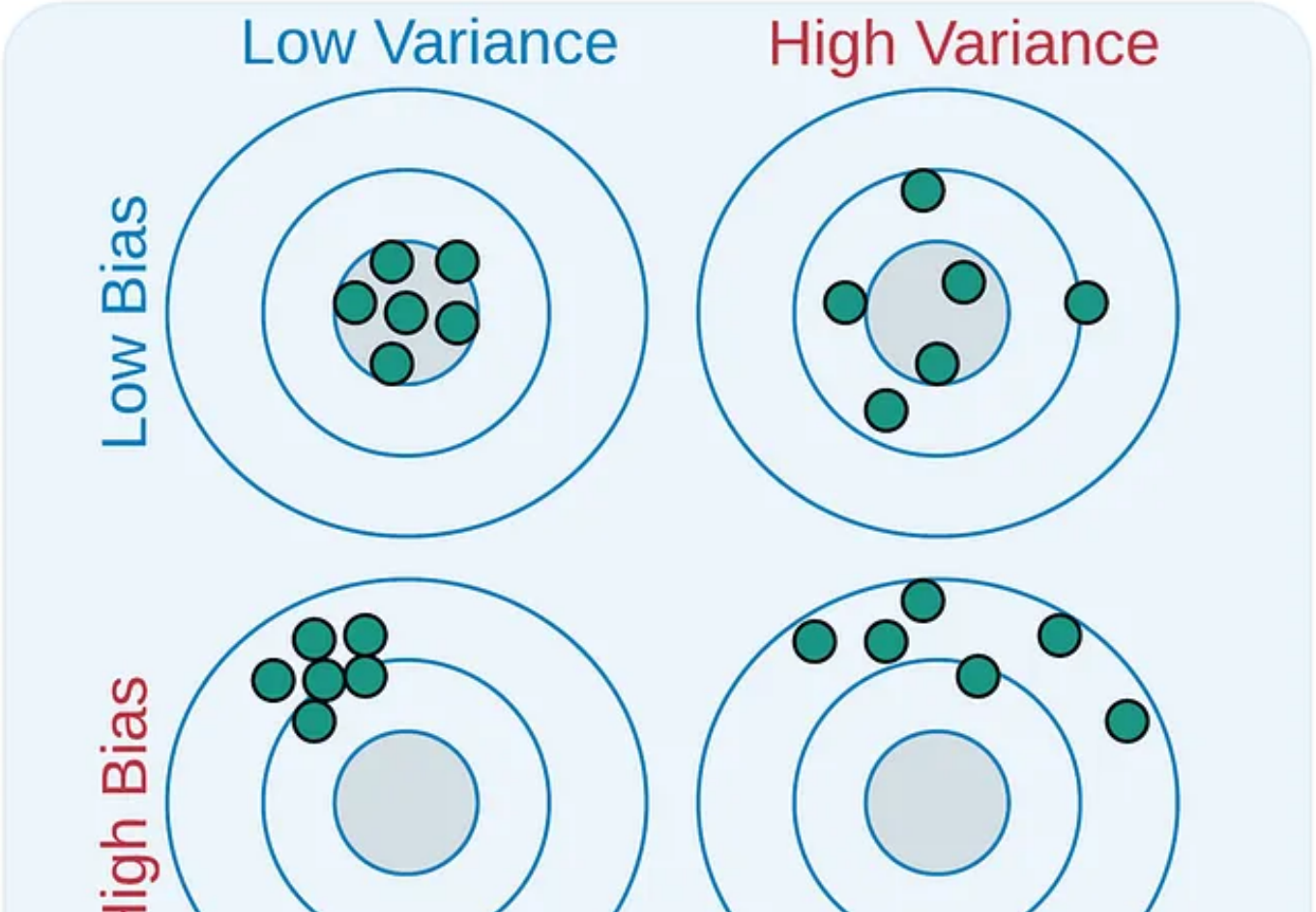


MC method

Monte Carlo Integration "Hit and Miss"

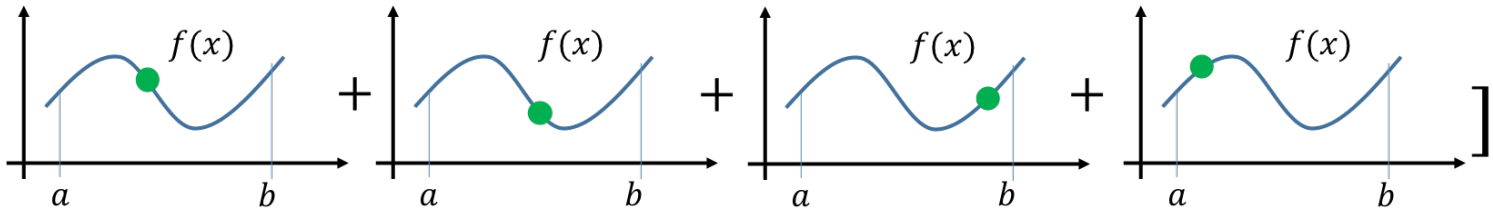
Try and then count.

Bias and Variance?

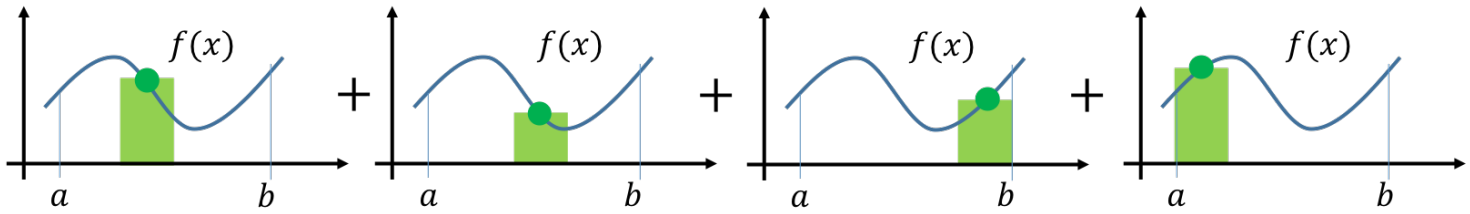


MC integration

$$\int_a^b f(x)dx = \frac{b-a}{4}$$



$$\int_a^b f(x)dx =$$



Random Numbers

HRNG: Hardware random number generator

PRNG: Pseudo Random number generator

Make your random number!