

Tilastollinen tietojenkäsittely

Exercise 4

14.11.2006

1. Write a line of R-code to produce 0 or 1 according to

$$P(X = 1) = \frac{m}{m+n}.$$

2. Approximate π by using MC method. How many decimals were correct when $n = 10, 100, 1000$ and 10000 ?

3. Approximate the volume determined by

$$z^2 + (\sqrt{x^2 + y^2} - 3)^2 \leq 1$$

by using MC method.

4. Write a function which generates values from $N(0, 1)$ by using a) CLT (central limit theorem) and b) Box-Muller transformation.
5. Assume that lifetimes of certain two components of a machine are distributed as $N(100, 400)$ and $N(90, 100)$. The lifetime of the machine is determined by the minimum lifetime of the two components. Estimate now the probability that the lifetime of the machine is less than a) 60 b) 70 c) 80 units.