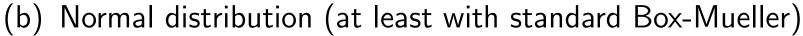
Exercise 3

- 1. Generate simulated values from the following distributions TU
 - (a) Exponential distribution



(c) Pareto distribution, with $\beta=1$ and experiment with different values of k values: $k=2.05,\ k=2.5,\ k=3$ and k=4.

Verify the results by comparing histograms with analytical results and perform tests for distribution type.

- 2. For the Pareto distribution with support on $[\beta, \infty[$ compare mean value and variance, with analytical results, which can be calculated as $\mathsf{E}(X) = \beta \frac{k}{k-1}$ (for k > 1) and $\mathsf{Var}(X) = \beta^2 \frac{k}{k-1}$ (for k > 2). Explain problems if any
- Var $(X) = \beta^2 \frac{k}{(k-1)^2(k-2)}$ (for k > 2). Explain problems if any. 3. For the normal distribution generate 100 95% confidence intervals for the mean and variance, each based on 10 observations. Discuss the results.
- 4. Simulate from the Pareto distribution using composition.