

Lab Nr. 4, Probability and Statistics

Continuous Random Variables; CDF and Inverse CDF

Let X have one of the following distributions: $X \in N(\mu, \sigma)$ (normal), $X \in T(n)$ (Student), $X \in \chi^2(n)$, or $X \in F(m, n)$ (Fischer). For given values of $x_0, x_1, x_2 \in \mathbb{R}$ and $\alpha, \beta \in (0, 1)$, compute the following:

- a) $P(X \leq x_0)$;
- b) $P(X \geq x_0)$;
- c) $P(x_1 \leq X \leq x_2)$ (for $x_1 < x_2$);
- d) $P(X \leq x_1 \text{ or } X \geq x_2)$ (for $x_1 < x_2$);
- e) the value x_α such that $P(X < x_\alpha) = \alpha$;
- f) the value x_β such that $P(X > x_\beta) = \beta$.