

## Lab Nr. 5, Probability and Statistics

### Numerical Characteristics of Random Variables

*Statistics Toolbox: stat*

The means and variances of the following distributions:

Distribution	Notation	Mean $E(X)$	Variance $V(X)$
discrete uniform	$U(m)$	$(m+1)/2$	$(m^2-1)/12$
binomial	$B(n, p)$	$n \cdot p$	$n \cdot p \cdot (1-p)$
hypergeometric	$H(N, n_1, n)$	$n \cdot n_1 / N$	$n \cdot n_1 \cdot (N-n_1) \cdot (N-n) / (N^2 (N-1))$
Poisson	$P(\lambda)$	$\lambda$	$\lambda$
Pascal (Neg. Bin.)	$NB(n, p)$	$n \cdot (1-p) / p$	$n \cdot (1-p) / (p^2)$
geometric	$G(p)$	$(1-p) / p$	$(1-p) / (p^2)$
uniform	$U(a, b)$	$(a+b)/2$	$(a-b)^2/12$
normal	$N(\mu, \sigma)$	$\mu$	$\sigma^2$
gamma	$Ga(a, b)$	$a \cdot b$	$a \cdot b^2$
exponential	$Exp(\lambda)$	$1/\lambda$	$1/\lambda^2$
beta	$\beta(a, b)$	$a / (a+b)$	$a \cdot b / ((a+b+1) \cdot (a+b)^2)$
Student	$T(n)$	0	$n / (n-2)$
chi squared	$\chi^2(n)$	$n$	$2 \cdot n$
Fisher	$F(m, n)$	$n / (n-2),$ $n > 2$	$2 \cdot n^2 (m+n-2) /$ $m \cdot (n-2)^2 (m-4),$ $n > 4$