

## 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	$U(m)$	$(n+1) / 2$	$(n^2 - 1) / 12$
binomial	$B(n, p)$	$n \cdot p$	$n \cdot p \cdot q$ , where $q=1-p$
hypergeometric	$H(N, n_1, n)$	$n \cdot p$	$n \cdot p \cdot q \cdot [(N-n)/(N-1)]$ , where $p=n_1/N$ $q=(N-n_1)/N$
Poisson	$P(\lambda)$	$\lambda$	$\lambda$
Pascal (Neg. Bin.)	$NB(n, p)$	$n \cdot p / q$	$n \cdot p / (1-p)^2$
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, if $n > 1$ undefined if $n = 1$	$n/(n-2)$
chi squared	$\chi^2(n)$	$n$	$2 \cdot n$
Fisher	$F(m, n)$	$n/n-2$	$2 \cdot n^2 \cdot (n+m-2) / m \cdot (n-2)^2 \cdot (n-4)$