Formula Sheet

STAT 620 – Dr. Myung

Discrete R.V.

X	S_X	PMF	$E(X)$	$\text{Var}(X)$	MGF
$\text{Ber}(p)$	$\{0,1\}$	$p^x(1-p)^{1-x}$	p	$p(1-p)$	$(1-p)+pe^t$
$\text{Bin}(n,p)$	$\{0,1,\ldots,n\}$	$\binom{n}{x}p^x(1-p)^{n-x}$	np	$np(1-p)$	$[(1-p)+pe^t]^n$
$\text{HG}(N_1,N_2,n)$	$x \leqslant n, x \leqslant N_1, n-x \leqslant N_2$	$\frac{\binom{N_1}{x}\binom{N_2}{n-x}}{\binom{N}{n}}$	$n\left(\frac{N_1}{N}\right)$	$n\left(\frac{N_1}{N}\right)\left(\frac{N_2}{N}\right)\left(\frac{N-n}{N-1}\right)$	
$\text{Geom}(p)$	$\{1,2\ldots\}$	$p(1-p)^{x-1}$	$\frac{1}{p}$	$\frac{1-p}{p^2}$	$\frac{pe^t}{1-(1-p)e^t}$ for $t < -\ln(1-p)$
$\text{NB}(r,p)$	$\{r,r+1\ldots\}$	$\binom{x-1}{r-1}p^r(1-p)^{x-r}$	$\frac{r}{p}$	$\frac{r(1-p)}{p^2}$	$\left[\frac{pe^t}{1-(1-p)e^t}\right]^r$ for $t < -\ln(1-p)$
$\text{Poisson}(\lambda)$	$\{0,1,\ldots,\}$	$\frac{\lambda^x e^{-\lambda}}{x!}$	λ	λ	$e^{\lambda(e^t-1)}$