TABLE II: SOME COMMON PROBABILITY DISTRIBUTIONS

Name	**Type**	**Parameters**	**Definition**	**Support**	$E(X)$	$\mathrm{Var}(X)$	**mgf**
Bernoulli	disc	$0 \le p \le 1$	$p_X(k) = p^k(1-p)^{1-k}$	$k = 0, 1$	p	$p(1-p)$	$e^t p + (1-p)$
binomial	disc	$n; 0 \le p \le 1$	$p_X(k) = \binom{n}{k} p^k (1-p)^{n-k}$	$k = 0, 1, \ldots, n$	np	$np(1-p)$	$(e^t p + (1-p))^n$
geometric	disc	$0 \le p \le 1$	$p_X(k) = (1-p)^{k-1} p$	$k = 1, 2, \ldots$	$\frac{1}{p}$	$\frac{1-p}{p^2}$	$\frac{pe^t}{1-(1-p)e^t}$
Poisson	disc	$\alpha > 0$	$p_X(k) = \frac{e^{-\alpha}\alpha^k}{k!}$	$k = 0, 1, \ldots$	α	α	$e^{\alpha(e^t-1)}$
uniform	cont	$a < b$	$f_X(x) = \frac{1}{b-a}$	$a \le x \le b$	$\frac{a+b}{2}$	$\frac{(b-a)^2}{12}$	$\frac{e^{bt}-e^{at}}{(b-a)t}$
exponential	cont	$\alpha > 0$	$f_X(x) = \alpha e^{-\alpha x}$	$x \ge 0$	$\frac{1}{\alpha}$	$\frac{1}{\alpha^2}$	$\frac{\alpha}{\alpha - t}$
gamma	cont	$r \ge 1; \alpha > 0$	$f_X(x) = \frac{\alpha}{\Gamma(r)}(\alpha x)^{r-1} e^{-\alpha x}$	$x \ge 0$	$\frac{r}{\alpha}$	$\frac{r}{\alpha^2}$	$\left(\frac{\alpha}{\alpha - t}\right)^r$
normal	cont	$\mu; \sigma > 0$	$f_X(x) = \frac{1}{\sigma\sqrt{2\pi}} e^{-\frac{1}{2}\left(\frac{x-\mu}{\sigma}\right)^2}$	$-\infty < x < \infty$	μ	σ^2	$e^{(t\mu + \sigma^2 t^2/2)}$