

Table I Summary of Common Probability Distributions

Name	Probability Distribution	Mean	Variance	Section in Book
Discrete				
Uniform	$\frac{1}{n}, a \leq b$	$\frac{(b + a)}{2}$	$\frac{(b - a + 1)^2 - 1}{12}$	3-5
Binomial	$\binom{n}{x} p^x (1 - p)^{n-x}$ $x = 0, 1, \dots, n, 0 \leq p \leq 1$	np	$np(1 - p)$	3-6
Geometric	$(1 - p)^{x-1} p$ $x = 1, 2, \dots, 0 \leq p \leq 1$	$1/p$	$(1 - p)/p^2$	3-7.1
Negative binomial	$\binom{x-1}{r-1} (1 - p)^{x-r} p^r$ $x = r, r + 1, r + 2, \dots, 0 \leq p \leq 1$	r/p	$r(1 - p)/p^2$	3-7.2
Hypergeometric	$\frac{\binom{K}{x} \binom{N-K}{n-x}}{\binom{N}{n}}$ $x = \max(0, n - N + K), 1, \dots$ $\min(K, n), K \leq N, n \leq N$	np , where $p = \frac{K}{N}$	$np(1 - p) \frac{N-n}{N-1}$	3-8
Poisson	$\frac{e^{-\lambda} \lambda^x}{x!}, x = 0, 1, 2, \dots, 0 < \lambda$	λ	λ	3-9
Continuous				
Uniform	$\frac{1}{b - a}, a \leq x \leq b$	$\frac{(b + a)}{2}$	$\frac{(b - a)^2}{12}$	4-5
Normal	$\frac{1}{\sigma \sqrt{2\pi}} e^{-1/2(\frac{x-\mu}{\sigma})^2}$ $-\infty < x < \infty, -\infty < \mu < \infty, 0 < \sigma$	μ	σ^2	4-6
Exponential	$\lambda e^{-\lambda x}, 0 \leq x, 0 < \lambda$	$1/\lambda$	$1/\lambda^2$	4-8
Erlang	$\frac{\lambda^r x^{r-1} e^{-\lambda x}}{(r - 1)!}, 0 < x, r = 1, 2, \dots$	r/λ	r/λ^2	4-9.1
Gamma	$\frac{\lambda x^{r-1} e^{-\lambda x}}{\Gamma(r)}, 0 < x, 0 < r, 0 < \lambda$	r/λ	r/λ^2	4-9.2
Weibull	$\frac{\beta}{\delta} \left(\frac{x}{\delta}\right)^{\beta-1} e^{-(x/\delta)^\beta}$ $0 < x, 0 < \beta, 0 < \delta$	$\delta \Gamma\left(1 + \frac{1}{\beta}\right)$	$\delta^2 \Gamma\left(1 + \frac{2}{\beta}\right)$ $-\delta^2 \left[\Gamma\left(1 + \frac{1}{\beta}\right)\right]^2$	4-10
Lognormal	$\frac{1}{x\sigma\sqrt{2\pi}} \exp\left(\frac{-[\ln(x) - \theta]^2}{2\omega^2}\right)$	$e^{\theta + \omega^2/2}$	$e^{2\theta + \omega^2}(e^{\omega^2} - 1)$	4-11