# Prefatory Comments

The book has been well recieved in reviews. I would much appreciate feedback on its use.

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# Corrigenda

## Chapter 3

Exercise 3.22:...exponential distribution

$$f_X(x) = \frac{1}{\beta} \exp\left(-\frac{x}{\beta}\right) \text{ for } x \geq 0$$

## Chapter 4

Figure 4.13: values on the y-axis below the x-axis should have a minus sign added; Utiles of $-20, -40$, etc.
Figure 4.25(b): end of upper branch, should read $-0.5$
Exercise 4.7: units of intensity are $\mathrm{Wm^{-2}s^{-1}}$

## Chapter 5

p 224, Example 5.1, second line from bottom:
...; for B $\tau_1$ is 'heads' and...
p 230, Figure 5.3: dimension should read

$$nx = \ell$$

(curly $\ell$)

## Chapter 6

Example 6.4, after Equation 6.35 add full stop, omit "and where... Lagrangian $L$"

## Chapter 8

p. 383 Line after (8.1), "Series (8.1)", not "Equation (8.1)"
p. 383 Line before (8.2), "...using the usual notation $E_i = 1$ (success) and $E_i = 0$ or $\tilde{E}_i = 1$ (failure):"
p. 416 bottom line "theparameter" → "the parameter"
p. 432 Note: varkapa ($\varkappa^2$) used for particular values of of chisquare ($\chi^2$)
p 435 under "Methodology", line 2 "An hypothesis is an assertion ..."; line 6, ..."on a road construction site..."

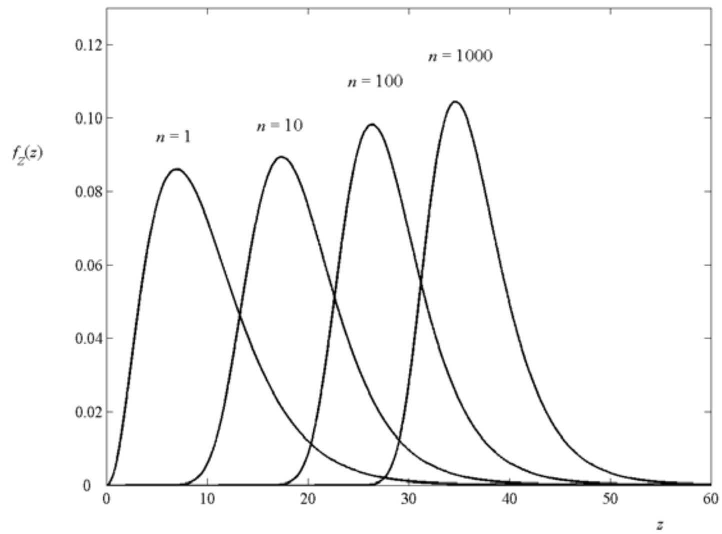


Figure 1:

# Chapter 9

Figure 9.3: Ordinate (y-axis) should be $f_Z(z)$ (probability density), not $F_Z(z)$

Corrections to the ordinate scales (y-axes) of Figures:

Figure 9.3(c), multiply scale by 0.1
Figure 9.4, divide scale by 0.01
Figure 9.6, divide scale by 5
Figure 9.7 divide scale by 5
Equations (9.30) and (9.31) should be written as

$$f_H\left(h\right) = \frac{4h}{h_s^2} \exp\left[-2\left(\frac{h}{h_s}\right)^2\right].$$

and

$$F_H\left(h\right) = 1 - \exp\left[-2\left(\frac{h}{h_s}\right)^2\right].$$

respectively.

## Exercise

9.9 An approximation that is often useful for very small $p\,(\ll 1/n)$ is

$$(1-p)^n \simeq 1 - np. \qquad ((9.172))$$

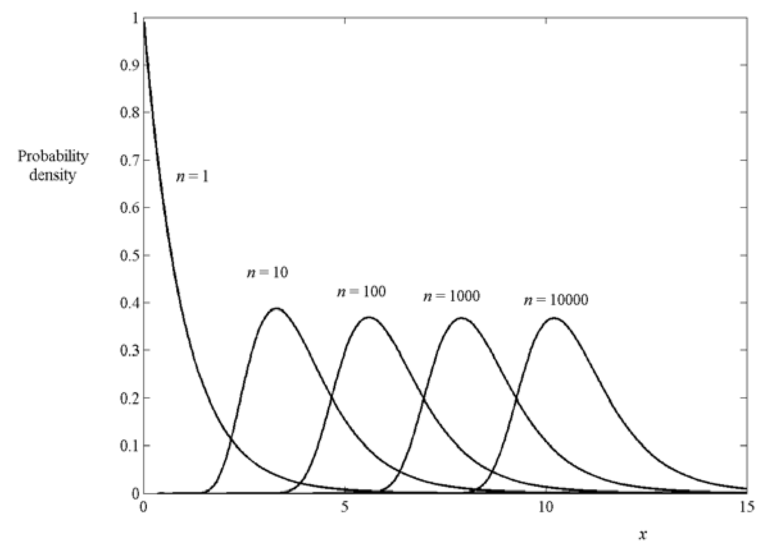


Figure 2: Figure 9.4, divide scale by 0.01

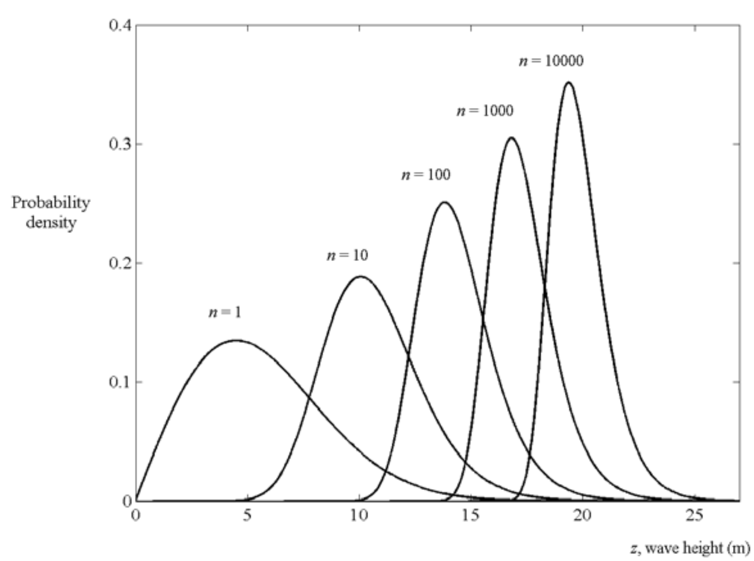


Figure 3: Figure 9.6, divide scale by 5

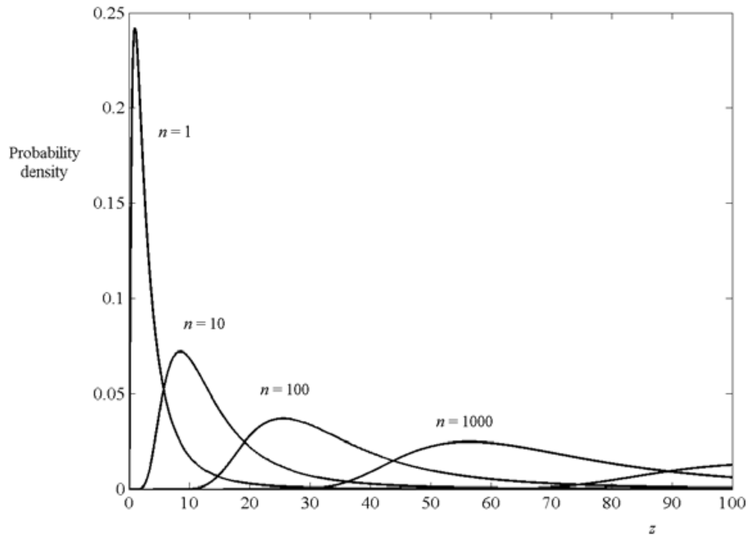


Figure 4: Figure 9.7 divide scale by 5

(a) Apply this in Exercise 9.8.

(b) Equation (9.49) states that

$$F_Z(x_n) = F_X^n(x_n) = \left(1 - \frac{1}{n}\right)^n \to \frac{1}{e},$$

in other words the $n$-year load on a structure has a 63% chance of being exceeded in $n$ years for large $n$. A designer wishes therefore to choose a more conservative value. He then considers a value $\breve{z}$ with a small probability of exceedance on the $n$-year load $p_{ne}$ such that

$$p_{ne} = 1 - F_Z(\breve{z}) \tag{(9.173)}$$

rather than the mode. Then if $X$ is the parent,

$$\begin{aligned} [F_X(\breve{z})]^n &= 1 - p_{ne}, \text{ or} && ((9.174)) \\ F_X(\breve{z}) &= (1 - p_{ne})^{1/n} \simeq 1 - \frac{p_{ne}}{n}, && ((9.175)) \end{aligned}$$

using a variation of the rule (9.172). Obtain $p_{ne}$ in terms of $a_n, b_n$ and $\alpha$ for a Weibull parent distribution based on Equation (9.119), with $X$ replacing $W$:

$$F_X(x) = 1 - \exp\left[-\left(\frac{x - a_n}{b_n}\right)^\alpha\right]. \tag{(9.176)}$$

An engineer in offshore practice would realize that a load factor is usually applied to the 100-year load, giving a result that approaches the situation described.

# Chapter 10

Figure 10.7(a): (Clarification) This is drawn correponding to the proof for Equation (10.6) rather thqn (10.5):

$$dp_f = f_T(x)\left[1 - F_S(x)\right] dx.$$

Figure 10.8: $\sigma$ and $\mu$ should have upper case subscripts, thus: $\sigma_M$ and $\mu_M$

# Chapter 11

p 603 7 lines from bottom, "girth" should be "girths"

# Appendix

p 633 Lognormal distribution add subscripts "$Y$" to $\mu$ and $\sigma$ where appropriate:

### Form

If a random quantity $X = \ln Y$ is normally distributed $\left(\mu, \sigma^2\right)$, then $Y$ is said to be lognormally distributed $\left(\mu_Y, \sigma_Y^2\right)$.

### *pdf*

$$f_Y(y) = \frac{1}{\sigma\sqrt{2\pi}} y^{-1} \exp\left[-\frac{(\ln y - \mu)^2}{2\sigma^2}\right], \text{ for } y > 0 \tag{1}$$

### *cdf*

### Mean and Variance

Let $a = \exp\mu, b = \exp\left(\sigma^2\right)$

$$\mu_Y = a\sqrt{b} = \exp\left(\mu + \frac{\sigma^2}{2}\right) \tag{2}$$

$$\sigma_Y^2 = a^2 b(b-1) = \exp\left(2\mu + \sigma^2\right)\left[\exp\left(\sigma^2\right) - 1\right] \tag{3}$$

Mode is at

$$\exp\left(\mu - \sigma^2\right) \tag{4}$$

Median is at

$$\exp\mu \tag{5}$$