Mathematical Statistics with Resampling and `R`, (First Edition). By Laura Chihara and Tim Hesterberg

Errata (11 January 2018)

Page xiii, paragraph 2, change Waldrop to Wardrop.

Page 6, First sentence in Section 1.7. Whom do you plan to vote for...

Page 15, Table 2.3: missing an interval $(300, 350]$, with frequency 2.

Page 23, line 1 and 3.
Alternatively, since we know the pdf of X is $f(x) = 3e^{-3x}, x \geq 0$, we could also solve for q_p in

$$p = P(X \leq q_p) = \int_0^{q_p} 3e^{-3t} dt.$$

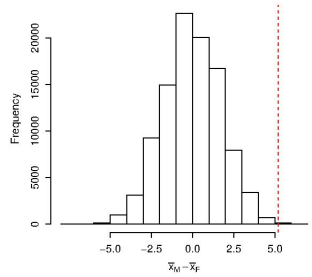
Page 26, `R` **Note**: line 11.
Delete: `abline(v = 25, col= "red")`.

Page 26: 4 lines above bottom of box, the legend command should be
`legend("topleft", legend=c("Males", "Females"), ...)`

Page 29, 2nd line above images:
while a variable with negative kurtosis is flatter...

Page 30, Exercise 3(c):
Are there any conditions that would ensure that $f(\bar{x})$ is the mean of the transformed data?

Page 42, Figure 3.3 is incorrect



Page 43 **Remark:** First line
One subtle point is that the transformation needs to be...
Page 43 Third line of **Remark**:
example, we used $p = P(\bar{X}_1 - \bar{X}_2 \geq \bar{x}_1 - \bar{x}_2)$.

Page 52, second equation $P(T \geq 5) \cdots = P(Z \geq 4.975)$

Page 53, line 4 from bottom:
For instance, the expected count for the (4, 2)-cell is $87 \times 409/1307 = 27.2249$.

Page 53, Table 3.4 The row corresponding to Graduate should be:
Graduate 64 50 114 56.6%

Page 54, Table 3.5

...		
HS	488.5065	222.4935
JrColl	59.7751	27.2249

Page 58 `R` **Note**, line 4:
`> 1 - pchisq(23.45, 4)`

Page 65, Table, 2nd line:
Observed count 30 30 22 18

Page 65, last unnumbered equation:

$$c = \frac{(30-22)^2}{22} + \frac{(30-30.6)^2}{30.6} + \frac{(22-18.6)^2}{18.6} + \frac{(18-28.7)^2}{28.7} = 7.53$$

Under the null hypothesis, the test statistic comes from a chi-square distribution with 4-1 degrees of freedom, so the P-value is $P(c \geq 7.53) = 0.056$, so it is plausible that the data do come from Exp(1).

Page 67, line 2. $f(x) = P(X = x) = \lambda^x e^{-\lambda}/x!, x = 0, 1, 2, ...$

Page 68, line 4:
The chi-square statistic is 0.84; the P-value is $P(\chi^2_3 > 0.84) = 0.84$.

Page 86, Example 4.8
$z = 3.917$ so $P(Z \geq 3.917) = 0.00004$.

Page 90, Example 4.12
Solution: Then $X \sim \text{Binom}(700, 0.229)$ with expected value...

Page 91 starting with Equation (4.5):

$$P\left(\frac{\bar{X}-\mu}{\sigma/\sqrt{n}} \leq z\right) \approx \Phi(z) - \frac{\kappa_3}{6\sqrt{n}}(z^2-1)\Phi'(z)$$

where $\Phi(z)$ is the standard normal CDF, $\Phi'(z)$ is its derivative, and $\kappa_3 = E[(X-\mu)^3]/\sigma^3$.

Page 97, Exercise 29(c). Delete $\text{E}[(X-\mu)^3] = 1/160$, add period after the word density.

Page 130, Exercise 6(a)
with k_1 occurrences of a_1, k_2 occurrences of a_2,....

Page 131, line 1:
Use simulation (with n = 200) to generate...

Page 132, exercise 14(a)
baby girls born in Wyoming and Alaska...
exercise 14(d) Conduct a permutation test to see if the difference in mean weights is statistically significant.

Page 136, 5 lines above Definition 6.1:
..., compute the derivative $L'(p) = 5p^4(1-p)^3 + p^5 3(1-p)^2(-1)$ and set this...

Page 139, line 2 from bottom:
from the exponential distribution with pdf $f(x;\lambda) = \lambda e^{-\lambda x}$.

Page 143, Equation (6.8)

$$\frac{\partial(\ln(L(k,\lambda)))}{\partial\sigma} = -\frac{n}{\sigma} + \frac{1}{\sigma^3}\sum_{i=1}^{n}(x_i-\mu)^2 = 0.$$

Page 145, Equation (6.10)

$$\frac{\partial(\ln(L(k,\lambda)))}{\partial k} = \frac{n}{k} - n\ln(\lambda) + \sum_{i=1}^{n}\ln(x_i) - \sum_{i=1}^{n}\left(\frac{x_i}{\lambda}\right)^k \ln\left(\frac{x_i}{\lambda}\right) = 0$$

Page 145, Equation (6.13)

$$\frac{1}{k} + \frac{1}{n}\sum_{i=1}^{n}\ln(x_i) - \frac{1}{\alpha}\sum_{i=1}^{n} x_i^k \ln(x_i) = 0$$

Page 152, Example 6.13 second paragraph, second line:
samples of size 25 from Unif$[0, 12]$. For each sample, we will compute $2\bar{x}$ and $26/25\times$...

Page 152 R **Note**:, 7 lines down

```
my.max[i] <- 26/25 * max(x)
```

Page 170 Example 7.2, item 1:
... cars in this company is between 29.5 and 33.4 mpg.
Page 178 Paragraph starting with Let X and Y...
$X - Y \sim \mathrm{N}(\mu_1 - \mu_2, \sigma_1^2 + \sigma_2^2)$
Page 178 Equation (7.9)
$\mathrm{N}(\mu_1 - \mu_2, \frac{\sigma_1^2}{n_1}) + \frac{\sigma_2^2}{n_2}$.

Page 190 **R Note**, last line:
(the interval is $[3422.98, \infty)$).

Page 191 Non-numbered equation above (7.17):

$$(\frac{n}{1.96^2} + 1)p^2 - (\frac{2n\hat{p}}{1.96^2}+1)p + \frac{n\hat{p}^2}{1.96^2} = 0$$

Page 193,**Remark (2nd bullet)**:
The center of the score interval is $(\hat{p} + q^2/(2n))(1 + q^2/n)$. If we set...

Page 194, **Solution**, 2nd equation:
radical sign (see Exercise 22).

$$1.96\sqrt{\frac{0.5(1-0.5)}{\tilde{n}}} \leq 0.04$$

Page 196, line 4:
assume that the statistic $T = (\bar{X} - \mu)/(S/\sqrt{n})$ follows...

Page 208 # 34. see Exercise 11, second line:
4 degrees of freedom (see Exercise 11 in Appendix B). Use...

Page 226 **Solution**, last equation:

$$P(Y \geq 5 \,|\, \theta = 2) = \sum_{k=5}^{8} \binom{8}{k} (0.3185)^k (1 - 0.3185)^{8-k} = 0.0736$$

```
> sum(dbinom(5:8, 8, 0.3185))
> 1- pbinom(4, 8, 0.3185)     #alternatively...
```

Page 244 Exercises # 28, 29, last sentence in both:
Include a graph similar to Figure 8.5.

Page 270, Theorem 9.4 item 4.
$\text{Var}[\hat{\alpha}] = \sigma^2 \left[1/n + \bar{x}^2/ss_x\right]$

Page 276 **Solution**, first equation:

$$11.36\sqrt{1 + \frac{1}{24} + \frac{199.7134}{2195.61}} \approx 12.09$$

Page 294, Exercise 5, second line:
$\text{Var}[Z] = 3$ and $\text{Cov}[X, Y] = -2$, $\text{Cov}[X, Z] = -4$, and $\text{Cov}[Y, Z] = 7$.

Page 295, Exercise 14, 3rd line
is more than 5%.

Page 304, First displayed equation

$$= \frac{(0.03)(0.128)}{P(\text{WLL})}$$

Page 309, Top Box:

The posterior distribution is proportional... .

Page 318, 2 lines above **Remark**:
quantiles of $N(45.53, 1.953^2)$: the probability that the true...

Page 325, Exercise 9, line 3:
$\mu \sim N(0.72, 0.08^2)$. He measures the BMD in ...

Page 337, line 1:
case is $\bar{Y}/\bar{X}$ as an estimator for $r = \mu_Y/\mu_X$.

Page 337, the paragraph before Equation (11.6) should read:
Using only the first approximation in Equation 11.5, $\bar{Y}/\bar{X} \approx r = \mu_Y/\mu_X$, suggests that the estimate is consistent.

Page 344 3rd line from bottom:
and then let $h(x) = \sin(x^2)\exp(-x^2 + x)$.

Page 344, last line:
domain, ..., and $f(x) = \exp -xI(x > 0)$

Page 351 Equation (11.20)

$$g(x) = \begin{cases} \lambda \exp(-\lambda(x - 700)) & x \geq 700 \\ 0 & x < 700 \end{cases}$$

Page 356, 1st paragraph, 3rd line:
This value is $-200^2(1/110 + 1/90)$.

Page 364, Example A.1

$$F(x) = P(X \leq x) = \int_0^x \lambda e^{-\lambda t}\, dt = 1 - e^{-\lambda x}$$

Page 394, Exercise 14
Prove that the expected value of $X \sim F_{m,n}$ is $n/(n-2)$ for $n > 2$.

Page 396, Under **Binomial**:
$f(x; n, p) = \binom{n}{x} p^x (1-p)^{n-x}$

Page 396, Under **Geometric**:
$f(x; p) = (1-p)^{x-1} p$

Page 398, Under **Gamma**, last column:
$(1 - t/\lambda)^{-r}$

Page 398, Under **Uniform**, last column
$\frac{e^{bt} - e^{at}}{(b-a)t}$

Solutions to Odd Exercises

Page 399, Chapter 2 # 3 (d): f is an increasing (or decreasing) function and n is odd, or f is linear.

Page 399, Chapter 2 #5(a) Favor: 899, Oppose 409

Page 400 Chapter 2, # 15. Delete entire line (so last solution given for Chapter 2 is for # 13.)

Page 400, Chapter 3 1.(b) The P-value is $2/10 = 0.2$.

Page 401, 21 $c = 8.5819$, P-value $= 0.724$.
Page 401, 23(a) Last sentence: "Conclude that the data do not come from $N(25, 10^2)$."

Page 401, Chapter 4
Page 401 3(a): Sampling distribution of $X+Y$ is $\{6, 8, 8, 9, 10, 10, 10, 11, 12, 12, 13, 14\}$.
11. $n = 90$.

Page 401 Chapter 4:
The numbering is off—delete the current # 17 (that is, delete 17. (c) 0.506) and renumber those following by 17, 19, 21, 23, 25, 27.

Page 402, Chapter 5 # 17(c)
1.63, SE = 0.319. (d) (1.17, 2.22).

Page 402, Chapter 6 # 17.
Shape = 0.917, scale = 17.344, C = 14.217, so times between successive earthquakes do not follow the Weibull distribution.

Page 402, Chapter 6 # 27(b)
$(\sigma^4/n^2)2(n-1)$.

Page 403, Chapter 6 # 33b Bias: $-17/(27\theta)$, MSE: $589/(2 \cdot 9^3\theta^2)$

Page 403, Chapter 7 # 7
118.01

Page 403, Chapter 7, # 9
(28.34, 33.53) cm.

Page 403, Chapter 7 # 13(b) (11.46664, ∞). We are 95% confident that, on average, seedlings grown in fertilized plots grew at least 11.5cm more than seedlings grown in non-fertilized plots.

Page 403, Chapter 7 # 21(a)
1064

Page 404, Chapter 8 # 23(b)
0.473

Page 404, Chapter 9 # 3:
133

Page 405, Chapter 10 # 15 (a)
$f(\theta) = 1/\theta^n$, where $\theta > \max\{X_1, X_2, \ldots, X_N\}$. (b) Pareto distribution with parameters $\alpha + N$, where $\theta > \max\{\beta, X_1, X_2, \ldots, X_N\}$. (c) 0.17.

Page 405, Chapter 10 # 17. (a) The typesetting for the exponential is bad. Should be closer to $\theta^n \, e^{\theta \sum_{i=1}^n X_i}$. Also, the answer labeled (c) should be labeled (d).

```
\theta^n\, e^{\theta\sum_{i=1}^n X_i}
```

Bibliography
Page 411, last line, change Waldrop to Wardrop.

Acknowledgements Thanks to Sandy Weisberg, Robert Hayden, Charles VanBuskirk, Bob Dobrow, Kristin Jehring, Elaine Newman, Katie St. Clair, John Hohwald, Paul Bamberg, Anne Grosse, Susan Coombs, Risako Owan, Eric Nordmoe, Kirk Goff, Ben Levy, Sushmit Roy, Jaehyo Rhee, Bruce McCullough and Kirk Goff for providing corrections.