

1016-345-01
Probability and Statistics for Engineers

Problem Set 5

Assigned 2013 April 9
Due 2013 April 16

Show your work on all problems! If you use a computer to assist with numerical computations, turn in your source code as well.

- 1 Devore Chapter 1, Problem 20
- 2 Devore Chapter 1, Problem 42
- 3 Devore Chapter 1, Problem 44
- 4 Devore Chapter 1, Problem 78
- 5 Computational Exercise (Extra Credit)

This is designed to give you some practice in dealing with larger data sets using a numerical computation environment such as scipy, matlab, mathematica, minitab, etc. Download the data for this problem from

http://ccrg.rit.edu/~whelan/courses/2013_1sp_1016_345/data/ps05_prob5.dat
using username bayes, password normal

- a. Calculate the sample median \tilde{x}
- b. Calculate the sample mean \bar{x} .
- c. Calculate the sample variance deviation directly as $s_x^2 = \frac{\sum(x_i - \bar{x})^2}{n-1}$.
- d. Calculate the sample variance using the shortcut formula $s_x^2 = \frac{1}{n-1} [\sum x_i^2 - \frac{1}{n}(\sum x_i)^2]$.
- e. Plot a histogram of the data, with bin boundaries at multiples of 10.
- f. Extra extra credit: construct the new dataset $y_i = 10^9 + x_i$ and calculate s_y^2 :
 - (i) directly using the calculated value of \bar{y} , and
 - (ii) using the shortcut formula. Comment on your results.