

1016-345-01

Probability and Statistics for Engineers

Problem Set 6

Assigned 2012 October 16
Due 2012 October 23

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 4, Problem 88

Note that problem 4.88 is different in the seventh and eighth editions of Devore. Be sure to do the problem from the eighth edition.

Also: Verify that the given z percentile values are correct to two decimal places by looking up their Φ values and comparing them to the required percentiles for a sample of size 15.

2 Devore Chapter 5, Problem 12

3 Devore Chapter 5, Problem 22

4 Devore Chapter 5, Problem 30

5 Computational Exercise (Extra Credit)

Download the two data sets for this problem from

http://ccrg.rit.edu/~whelan/courses/2012_3fa_1016_345/data/ps06_prob5_set1.dat

and

http://ccrg.rit.edu/~whelan/courses/2012_3fa_1016_345/data/ps06_prob5_set2.dat

using username bayes, password normal

For each dataset, construct a normal probability plot by sorting the data into ascending order and plotting $z_{1-(i-.5)/n}$ vs x_i , where n is the number of points in the dataset, $i = 1 \dots n$, x_i is the i th datapoint in the sorted set, and z_α is defined as usual by $\Phi(z_\alpha) = 1 - \alpha$. You may find it useful to construct a function which uses the inverse error function to calculate z_α for a given α ; e.g., in `scipy/matplotlib`, you can use

```
from scipy.special import erfinv
def zscore(Phi):
    return np.sqrt(2) * erfinv( 2.0 * Phi - 1.0 )
```