

# ECE 341 - Homework #10

Testing with Normal Distributions & Regression Analysis. Due Thursday, June 2nd

## Testing with Normal Distributions

Let A be the sum of 10 uniform distributions in the range of (0,6)

$$A = \text{sum}( 6 * \text{rand}(1, 10) );$$

Let B be the sum of 8 uniform distributions in the range of (0,10)

$$B = \text{sum}( 10 * \text{rand}(1, 8) );$$

- 1) What is the mean and standard deviation for A and B?
- 2) Using a normal approximation, determine the 90% confidence interval for A.
- 3) Using a normal approximation, determine the probability that  $A > 40$ .
- 4) Let Y be a sample from either A or B. To determine which group Y came from, a threshold test is used:
  - If  $Y < 35$ , Y is assumed to be from A (negative)
  - If  $Y > 35$ , Y is assumed to be from B (positive)

Determine the probability of

- A false positive (Y is from A but testing resulted in it being assigned to population B)
- A false negative (Y is from B but testing resulted in it being assigned to population A)

## Regression Analysis

The average temperature in June in Fargo, ND is available at

[http://www.bisonacademy.com/ECE111/Code/Fargo\\_Weather\\_Monthly\\_Avg.txt](http://www.bisonacademy.com/ECE111/Code/Fargo_Weather_Monthly_Avg.txt)

- 5) Find the least-squares curve fit for this data as

$$T = ay + b$$

where T is the temperature in degrees F and y is the year.

From this curve fit, how much has June in Fargo warmed up since 1942?

- 6) Determine the correlation coefficient between
  - The average temperature in June and July  
*if June is hot, is July going to be hot?*
  - The average temperature in June and January.  
*if January is hot, is June going to be hot?*