

ECE 341 - Homework #7

Uniform and Exponential Distributions

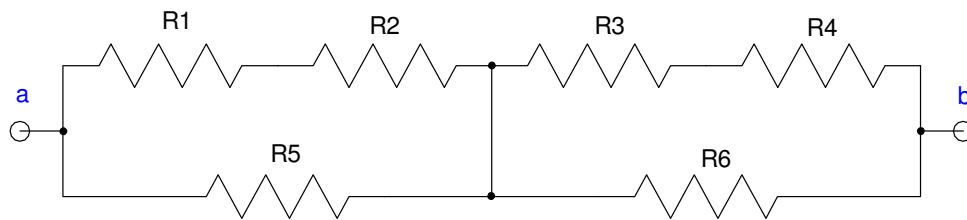
Uniform Distributions

Let

- **a** be a sample from A, a uniform distribution over the range of (2, 3)
- **b** be a sample from B, a uniform distribution over the range of (0, 4)

- 1) Determine the pdf for **a + b** using moment generating functions (i.e. Laplace transforms)
- 2) Determine the pdf for **a + b** using convolution (by hand or Matlab)

- 3) Determine R_{ab} as a function of $R_1..R_6$



- 4) Assume each resistor has a nominal value of 100 Ohms and 10% tolerance

$$R1 = 100 * (0.9 + 0.2 * \text{rand});$$

Determine the net resistance, R_{ab} , for 1000 random values of R's.

Exponential Distribution

- 5) A telephone call has an exponential distribution with mean = 2 minutes. What is probability that a given phone call will last more than 10 minutes?
- 6) Yellowstone volcano is an exponential distribution with a mean of 725,000 years. What is the probability that it will remain dormant for the next 1000 years?

- 7) Assume

- Customers arrive at a restaurant with an exponential distribution with a mean of 80 seconds.
- Once a customer's order is taken, the time it takes to fill a customer's order is an exponential distribution with a mean of 30 seconds.

For 200 customers, determine

- The maximum queue size and
- The maximum wait time a customer sees.