

Part 1: Fitting distributions to data

Unless specified otherwise, use $\alpha = 0.05$ in the K-S.

Problem 1.

Use the concrete strength and density data from Homework 2 for this problem.

- Do the strength data plot as a straight line on Normal probability paper? Provide your answer as yes, or no; no metrics required for assessment.
- Use the K-S method to assess whether the data sets are Normal or Lognormal.

Problem 2.

Using the Timber MOR data from Homework 2, use the K-S method to determine the goodness of fit of the 2-parameter Weibull distribution. Hint: you will need to use the method of moments to identify the distribution parameters. Extra credit if you find a different method for determining the Weibull parameters other than method of moments.

Part 2: Using the distributions to assess probabilities.

Problem 3. 4.33 from the text. (p. 104)

Problem 4. 4.34 from the text (p. 105)

Part 3: Functions of random variables.

Problem 5. 6.14 from the text (p.177).

Problem 6. The resistance or strength (capacity) and the stress (demand) for the design of a component are lognormally distributed with the following information:

$$E(\text{Capacity} \equiv \text{Resistance } R) = 750 \text{ MPa} = \mu_R$$

$$\sigma_R = 50 \text{ MPa}$$

$$E(\text{Demand} \equiv \text{Stress } S) = 500 \text{ MPa} = \mu_S$$

$$\sigma_S = 80 \text{ MPa}$$

Compute the reliability of the component.