

Applied Stochastic Models (SS 09)

Problem Set 7

Problem 1

Compute the reliability function of the bridge system by conditioning upon whether or not component 3 is working.

Problem 2

Compute the upper and lower bounds from class for the reliability function for the two-out-of-three system and two-out-of-four system. Compare these bounds with the exact reliability when

$$p_i \equiv 0.8, p_i \equiv 0.5 \text{ and } p_i \equiv 0.2.$$

Problem 3

- (a) Prove that F is an IFR distribution iff $\log(\bar{F}(t))$ is concave.
- (b) Deduce that if F is IFR, then $[\bar{F}(t)]^{1/t}$ is decreasing in t .

Problem 4

Show that $r(\mathbf{p} \cdot \mathbf{p}') \leq r(\mathbf{p})r(\mathbf{p}')$ (where $(p_1, \dots, p_n) \cdot (p'_1, \dots, p'_n) := (p_1p'_1, \dots, p_np'_n)$) and give an interpretation.