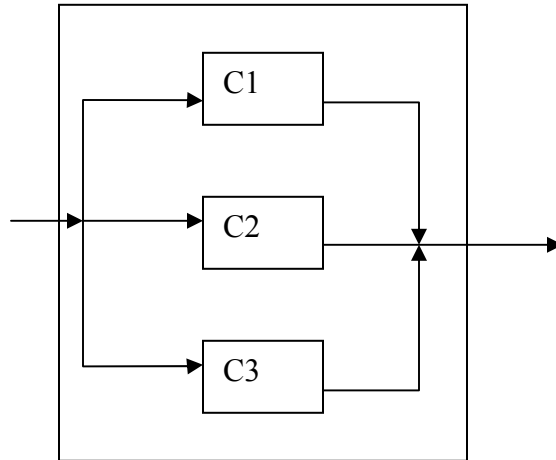


Probability Theory and Applications – In class Assignment

We have a machine with 3 redundant components. The machine will function as long as one of the three components functions works. The time to failure of each of the components is exponential with mean of 1 year? Assume the failures of the components are independent? How long will the machine work?



Let C_1 , C_2 , and C_3 be random variables representing the time to failure of each component. Let Y be a random variable representing the time to failure of the machine.

Express Y as a function of C_1 , C_2 , C_3 .

If Y lasts less than a half year, can any of the components last more than a half year?

If Y last less than or equal to y year(s), what can you say about the time to failure of the each of the components?

Complete the following

$$P(Y \leq y) = P(C_1 \leq \quad, C_2 \leq \quad, C_3 \leq \quad)$$

Express the cdf of Y as a function of the cdf 's of C_1, C_2, C_3 .

What is the pdf of Y ?