**Dependable Systems and Networks HW#3**

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1. The lifetime (measured in years) of a processor is exponentially distributed, with a mean lifetime of 2 years. You are told that a processor failed sometime in the interval [4, 8] years. Given this information, what is the conditional probability that it will fail before it was 5 years old?

Sol:

1. A component with time to failure T has constant failure rate λ=2.5\*/hour
   1. Determine the probability that the component survives a period of 2 months without failure   
      (Assume each month has 30 days)
   2. Find the MTTF of the component
   3. Find the probability that the component survives its MTTF

Sol:

1. The lifetime of a processor (measured in years) follows the Weibull distribution,   
   with parameters λ = 0.5 and β = 0.6.
   1. What is the probability that it will fail in its first year of operation?
   2. Suppose it is still functional after t = 6 years of operation.   
      What is the conditional probability that it will fail in the next year?
   3. Repeat parts (a) and (b) for β = 2.
   4. Repeat parts (a) and (b) for β = 1

Sol:

0.3934

* 1. (b) 0.1323
  2. (c) 0.9984
  3. (d) 0.3934

1. A component may fail due to two different causes, A and B. It has been shown that the time to

failure TA caused by A is exponentially distributed with density function

t >= 0, while the time to failure TB caused by B is exponentially distributed with density

function for t >= 0.

* 1. Describe the rationale behind using f (t) = pfA (t) + (1− p) fB (t)

as the probability density function for the time to failure

* 1. Explain the meaning of p in this model

Sol:

* 1. (b) 0.1323

1. ddd