ECE454/544 Extra-Credit Question (Fall 2022)

A machine with constant failure rate λ will survive a period of 200 hours without failure, with the probability of 0.97.
- – Determine the failure rate λ
- – Find the mean time to failure (MTTF) of the machine
- – Find the probability that the machine will survive 1000 hours without failure

① $e^{-\lambda t} = 0.97$ $e^{-\lambda * 200} = 0.97$

③

$$-\lambda 200 = \ln 0.97$$

$$\lambda = \frac{-\ln 0.97}{200} = 0.00015229\,6$$

② $MTTF = \frac{1}{\lambda} = 6566 \text{ hrs}$ ①

③ $e^{-\lambda t} = e^{-0.000152296 * 1000}$

$$= 0.858734.$$

②