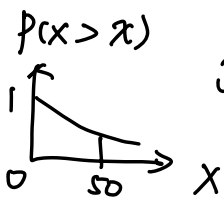
Problem 2.2

Q: (a) Mean time between failures

Solution (a) $E(X) = \frac{1}{\lambda} = \frac{1}{0.01} = 100$ hours

(b) $P(X > 50) = ?$



$f(x) = \lambda e^{-\lambda x}$

Solution $P(X \geq 50) = e^{-\lambda 50}$

$= e^{-0.01 \times 50}$

$= e^{-0.5}$

$= 0.6065$

(c) $P(X > 50 \mid X > 40)$

$= P(X > 40 + 10 \mid X > 40)$

$= P(X > 10)$

$= e^{-\lambda 10}$

$= e^{-0.01 \times 10}$

$= e^{-0.1}$

$= 0.9048$

(d) $P(X \leq 15 \mid X > 10)$

$$= P(X \leq 10+5 \mid X > 10)$$

$$= P(X \leq 5)$$

$$= 1 - e^{-5\lambda}$$

$$= 1 - e^{-0.05}$$

$$= 0.04877$$