

Problem 139

Given: 2 independent people

Each has probability .3 of being hospitalized

If one is hospitalized, Loss \sim Uniform $[0, 1]$

$$E(\# \text{ hospitalized} | \text{Total loss} < 1) = 0 \cdot P(0 \text{ hospitalized} | \text{Total loss} < 1) \\ + 1 \cdot P(1 \text{ hospitalized} | \text{Total loss} < 1) \\ + 2 \cdot P(2 \text{ hospitalized} | \text{Total loss} < 1)$$

0 hospitalized	1 hospitalized	2 hospitalized

$$p(0) = (1 - .3)^2 \\ = .49$$

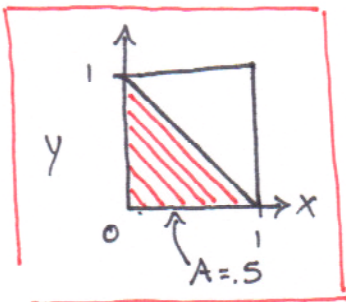
$$p(1) = 2(.3)(1 - .3) \\ = .42$$

$$p(2) = (.3)^2 \\ = .09$$

$$P(\text{Total Loss} > 1) = .5(.09) \\ = .045$$

$$\Rightarrow P(\text{Total Loss} < 1) = .955$$

By independence



$$P(X \text{ hospitalized} | \text{Total Loss} < 1) = \frac{P(X \text{ hospitalized} \cap \text{Total Loss} < 1)}{P(\text{Total Loss} < 1)}$$

$$P(0 \text{ hospitalized} | \text{Total Loss} < 1) = \frac{.49}{.955}$$

$$P(1 \text{ hospitalized} | \text{Total Loss} < 1) = \frac{.42}{.955}$$

$$P(2 \text{ hospitalized} | \text{Total Loss} < 1) = \frac{.5(.09)}{.955}$$

$$E(\# \text{ hospitalized} | \text{Total Loss} < 1) = 0 \left(\frac{.49}{.955} \right) + 1 \left(\frac{.42}{.955} \right) + 2 \left(\frac{.045}{.955} \right) \\ = .534$$

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