Poisson Hypotheses Testing

Ex 4A

7) For 5 weeks $X \sim Po(0.2 \times 5) \sim Po(1)$

$H_0 : \lambda = 1$

$H_1 : \lambda > 1$

$P(X \geq 3)$

$= 1 - P(X \leq 2)$

$1 - 0.9197 = 0.0803$

$> 5\%$

Accept H_0

Not sufficient evidence to suggest number of breakdowns has increased

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11) $X \sim Po(0.3)$

$Y \sim Po(0.3 \times 20) \sim Po(6)$

a) $P(Y = 5) = 0.1606$

b) $P(Y \leq 8) = 0.8472$

c) $X \sim Po(30 \times 0.3) \sim Po(9)$

$H_0 : \lambda = 9$

$H_1 : \lambda < 9$

λ is mean breakdowns per 30 days

$P(X \leq 5) = 0.1157 > 5\%$

Accept H_0 Not sufficient evidence to suggest number of breakdowns has reduced.

Exercise 4B

a) $X \sim Po(5)$

$H_0 : \lambda = 5$

$H_1 : \lambda \neq 5$

λ is mean defects per 35m

10% sig level

5% each end

$P(X \leq 1) = 0.0404 < 5\%$

$P(X \leq 2) = 0.1246 > 5\%$

CR $\{0, 1\}$

$P(X \geq 9) = 1 - P(X \leq 8)$

$= 1 - 0.9319$

$= 0.0681 > 5\%$

$P(X \geq 10) = 1 - P(X \leq 9)$

$= 1 - 0.9681$

$= 0.0319 < 5\%$

CR $\{\geq 10\}$

Solution C.R. $= X = 0, 1$

$X \geq 10$

Actual sig level $0.0404 + 0.0319$

$= 7.23\%$
