

Modelling and simulation Lab

M.Tech 201761003

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Question 1:

Suppose that a number of defects coming from an assembly line can be modeled as a Binomial counting process with frames of one-half- minute length and probability = 0.02 of a defect during each frame.

- Find the probability of going more than 20 minutes without a defect.
- Determine the arrival rate in units of defects per hour.
- If the process is stopped for inspection each time a defect is found, on average how long will the process run until it is stopped?

Solution:

a) $\Delta = 30$ seconds

$P = 0.02$

$P(T_i > 20) = P(\Delta Y > 20)$

$= P(Y > 20/\Delta)$

$= P(Y > 20/0.5)$

$= \sum_{x=1}^{40} p(1-p)^{x-1}$ b)

$\Delta = 0.5$

$\lambda = ?$

$P = 0.02$

$\lambda = P/\Delta = 0.02/0.50$

Question 2: Customers of a certain internet service provider connect to the internet at the average rate of 3 customers per minute. Assuming Binomial counting process with 5-second frames,

- Compute the probability of more than 10 new connections during the next 3 minutes.
- Compute the mean and the standard deviation of the number of seconds between connections.

Solution:

$\Delta = 0.5$

$\lambda = ?$

$P = 0.02$