ASQ CRE Prep course

Lesson II. A. 4. a.

Poisson Process Models

Homogeneous Poisson Process

Counting the arrivals of failures

HOMOGENEOUS POISSON PROCESS

HPP and Poisson Distribution

- **Independence**
- **Proportional to interval length**
- **One event at a time**

$$\Pr\{N(t)=k\}=e^{-\lambda t}\frac{(\lambda t)^k}{k!}$$

- **N(t) # of occurrences**
- **t is interval length**
- **λ t is mean and variance (Poisson)**

$$1-\Pr\{N(t)=0\}=1-e^{-\lambda t}$$

Assuming Exponentially Distributed Failure Times

- **Probability of failure in any interval is exponentially distributed**

- **Memoryless**
- **Repairs restore to as new**

Example

- **What is probability of failure during 40 hour week with λ =0.002?**

Example

- **What is probability of failure during 40 hour week with λ =0.002?**

$$F(40) = 1 - e^{-\lambda t}$$

$$F(40) = 1 - e^{-0.002(40)}$$

$$F(40) = 1 - 0.923$$

$$F(40) = 0.077$$

Maintenance Strategy?

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Lesson II. A. 4. b.

Poisson Process Models

Repair System Terminology