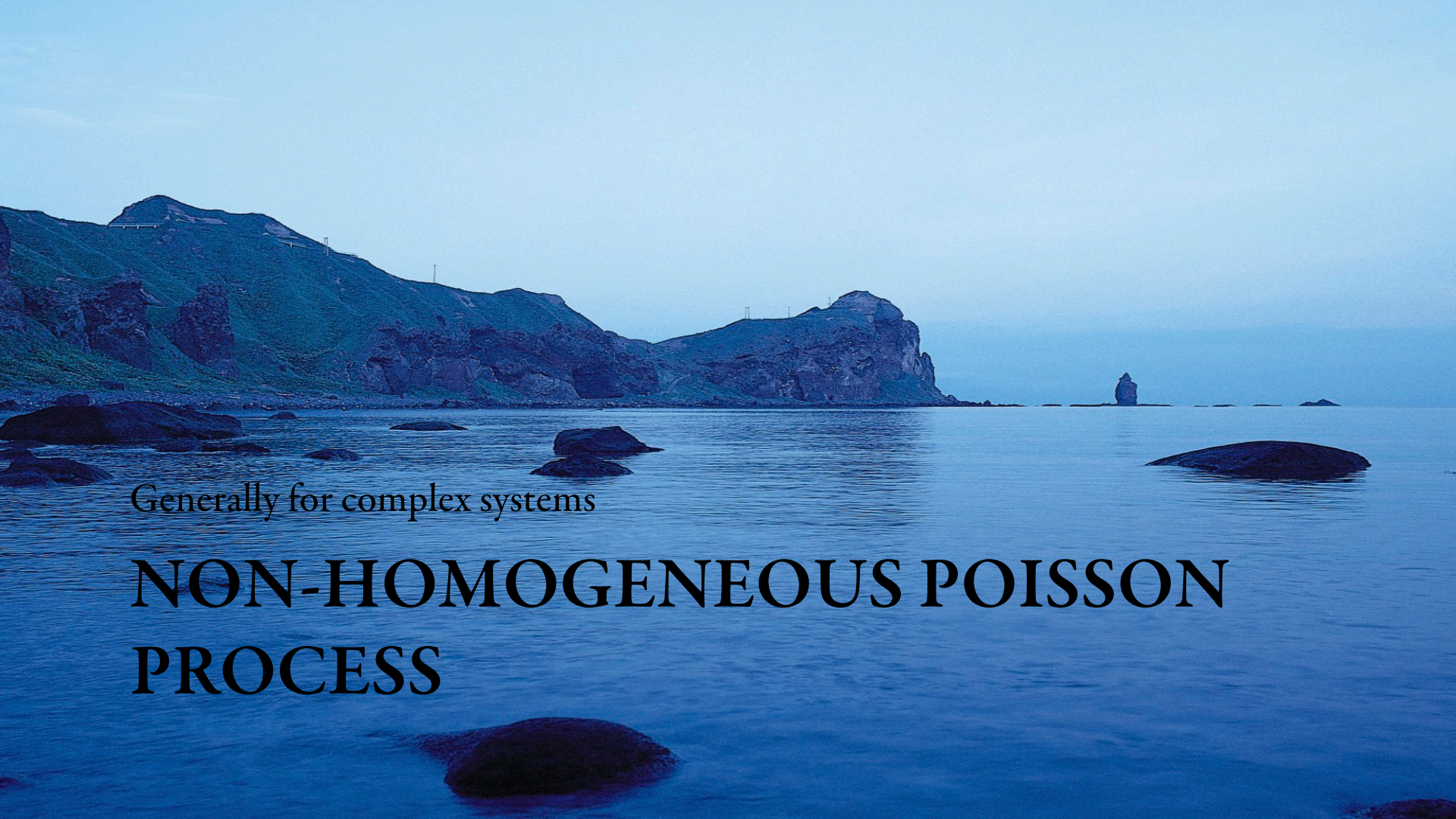
ASQ CRE Prep course

Lesson II. A. 4. c.

Poisson Process Models

Non-Homogeneous Poisson Process



Generally for complex systems

NON-HOMOGENEOUS POISSON PROCESS

Generalized NHPP

- **Repairs do not fully restore to as new condition**
- **Operating times between repairs may not be independent or identically distributed**

Models for Mean Repair Function

- **M(t) is the mean repair function**

$$M(t) = at^b$$

- **Power Model – linear on log-log paper**

$$M(t) = ae^{tb}$$

- **Exponential Model – linear on semi log paper**
- **Often we assume constant failure rate between repairs to use HPP**

Example

- **Let's say a system follows NHPP with**

$$M(t) = 0.002t^{1.3} \text{ for } t > 0$$

- **Find expected number of failures between 168 hrs and 672 hrs**

Example

- **Let's say a system follows NHPP with**

$$M(t) = 0.002t^{1.3} \text{ for } t > 0$$

- **Find expected number of failures between 168 hrs and 672 hrs**

$$M(672) - M(168)$$

$$0.002(672)^{1.3} - 0.002(168)^{1.3}$$

$$3.421 - 0.605 = 2.81$$

Is it appropriate to assume constant failure rates?

ASQ CRE Prep course

Lesson II. A. 4. d.

Poisson Process Models

Mann Reverse Arrangement Test