Topics Covered in Lecture 18

10-September-2002

- Home work #3 solutions are discussed.
- Example 5.16 is discussed.
- c denotes the probability of occurances of *covered* faults, and is known as the **coverage factor**(or **coverage parameter**)[BOUR 1969].

$$\begin{aligned} c &= P(\text{“system recovers”}\,|\,\text{“fault occurs”}) \\ &= (\text{detection coverage}) \times (\text{location coverage}) \times (\text{recovery coverage}) \\ &= c_d.c_l.c_r. \end{aligned}$$

- $$\begin{aligned} c_\gamma &= P(Y < X) \\ &= \int_0^\infty P(X > Y | Y = t) f_Y(t)\, dt \\ &= \int_0^\infty P(X > t) f_Y(t)\, dt \\ &= \int_0^\infty e^{-\gamma t} f_Y(t) dt = L_Y(\gamma). \end{aligned}$$

- $$c = c_d L_D(\gamma) c_l L_L(\gamma) c_r L_R(\gamma).$$

- Example 5.17 is discussed. Here “equivalent” coverage c is given by

$$c = \frac{\lambda c_1 + \mu c_2}{\lambda + \mu}$$

- **Random Sums:** If the number of variables being added itself is random, then it is called as random sums.

$$T = X_1 + X_2 + \ldots + X_N. \qquad \text{Here N is random}$$

- For fixed value N = n, the conditional expectation of T is obtained:

$$\begin{aligned} E[T|N = n] &= \sum_{i=1}^{n} E[X_i] \\ &= nE[X]. \end{aligned}$$

  Then, using the theorom of total expectation, we get

$$\begin{aligned} E[T] &= \sum_{n} nE[X]p_N(n) \\ &= E[X]\sum_{n} np_N(n) \\ &= E[X]E[N] \end{aligned}$$

$$L_{T|N}(x|n) = [L_X(s)]^n.$$

$$\begin{aligned} L_T(S) &= \sum_{n} L_{T|N}(s|n)p_N(n) \\ &= \sum_{n}[L_X(s)]^n p_N(n) \\ &= G_N(L_X(s)). \end{aligned}$$

- Example 5.22 is discussed.

- Chapter 5 is over.