Development

The purpose of this paper is to determine the optimal inspection time interval which maximizes the average profit rate. In order to attain this aim it is necessary to determine the probabilities $P_i(t)$.

In the stationary case, we obtain the following differential equations:

$$\frac{dP_1(t)}{dt} = -(\lambda_{12} + \lambda_{13})P_1(t) + \mu_I(1 - q_I)P_3(t) + \mu_{II}(1 - q_{II})P_4(0)\exp\{-(1 - q_{II})t\}$$

$$\frac{dP_2(t)}{dt} = \lambda_{12}P_1(t) - \lambda_{23}P_2(t)$$

$$\frac{dP_3(t)}{dt} = \lambda_{13}P_1(t) + \lambda_{23}P_2(t) - \mu_I(1 - q_I)P_3(t)$$

$$\frac{dP_4(t)}{dt} = -\mu_{II}(1 - q_{II})P_4(t) \qquad (1)$$

The boundary conditions:

$$P_1(0) = P_1(x),\ P_2(0) = 0,$$

$$P_3(0) = P_3(x),\ P_4(0) = P_2(x - 0) + P_4(x - 0)$$

$$\sum_{i=1}^{4} P_i(t) = 1, (0 \le t \le x) \qquad (2)$$

The function $K(x)$ has the form:

$$K(x) = \sum_{i=1}^{4} (-1)^k \bullet c_i \bullet z_i(x) - \frac{d}{x}(1 - P_3(x) - P_4(x)), \qquad (3)$$

$$z_i \equiv \frac{1}{x}\int_0^x P_i(t)dt,\ i = 1, \ldots, 4 \qquad (4)$$

$$k \equiv \begin{cases} 0, & \text{if } i = 1, 2 \\ 1, & \text{if } i = 3, 4 \end{cases} \qquad (5)$$

An optimization problem consists in finding the x^* which maximizes $K(x)$, ie, $K(x^*) = \max_x\{K(x)\}$.

The solution of (1) with respect to $P_i(t)$, $i = 1, \ldots, 4$; the computer program, and an example illustrating the model are given in a separately available Supplement [8].

ACKNOWLEDGMENT

Some of the results of this paper were presented in [2] at Prague, Czechoslovakia.

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[8] Supplement: NAPS document No. 04300-C; 15 pages in this Supplement. For current ordering information, see "Information for Readers Authors" in a current issue. Order NAPS document No. 04300, 95 pages. ASIS-NAPS; Microfiche Publications; POBox 3513, Grand Central Station; New York, NY 10163 USA.

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Janusz Karpiński: For biography see vol R-32, 1983 Dec, p 449.

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CORRECTIONS 1985 OCTOBER ISSUE CORRECTIONS 1985 OCTOBER ISSUE CORRECTIONS 1985 OCTOBER ISSUE CORRECTIONS

Corrections: Confidence Bounds for the Percentiles of a Wearout Failure Distribution

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There are 3 corrections to [1].

1. Page 358, col 2, subsection 4.2: Replace ξ by ζ everywhere it appears.

2. Page 358, col 2, (25): Extend the square root to include remainder of the expression.

Page 359, col 1: The source for ref [3] should read:

Moscow, Energy Publ., 1984; in Russian.

REFERENCE

[1] F. Beichelt, "Confidence bounds for the percentiles of a wearout failure distribution", *IEEE Trans. Reliability,* vol R-34, 1985 October, pp 356-359.

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