

ON EXHIBITING INVENTORY SYSTEMS WITH ERLANGIAN LIFETIMES UNDER RENEWAL DEMANDS

S. KALPAKAM¹ AND G. ARIVARIGNAN²

¹*Department of Mathematics, Indian Institute of Technology, Madras-600 036, India*

²*Department of Statistics, Presidency College, Madras-600 005, India*

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Abstract. A continuous review (s, S) inventory system with renewal demand in which one item is put into operation as an exhibiting piece is analyzed. The lifetime of any operating unit has Erlangian distribution, and on failure is replaced by another one from the stock and the failed item is disposed of. Replenishment of stock is instantaneous. The transient and stationary values of inventory level distribution and the mean reorder rate are obtained using the techniques of semi-regenerative processes. Decision rules for optimum s and S that minimize the long-run expected cost rate are derived. The solution for a dual model with the distribution of lifetimes and inter-demand times interchanged is also given.

Key words and phrases: Exhibiting inventory system, (s, S) policy, renewal demands, Erlangian lifetimes, inventory level distribution, mean reorder rate, optimal cost analysis.