Bilkent University Lecture Series

İzzet Şahin

Regenerative Inventory Systems

Operating Characteristics and Optimization

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To Murat and Tolga

Preface

This is a renewal-theoretic analysis of a class of single-item (s, S) inventory systems. Included, in a unified exposition, are both continuous and periodic review systems under fairly general random demand processes. The monograph is complete in the sense that it starts from the derivation of the time dependent and stationary distributions of basic stochastic processes related to these systems and concludes with the construction and testing of simple, distribution-free approximations for optimal control policies. However, it is rather incomplete as an account of single-item inventory systems in that it narrowly focuses on systems with full backlogging of unfilled demand and constant lead times, through what has come to be known as stationary analysis.

The level is intermediate, and the style is informal. Some prior knowledge of probability theory and inventory control is assumed on the part of the reader. Given these, the monograph is self-contained. Extensive use is made of renewal-theoretic concepts and results; these are reviewed in Chapter 2.

The text relies heavily on my previously published work on the subject. Over the years, this research has been supported by the Sci-

entific and Technical Research Council of Turkey, National Research Council of Canada (1978-79, A3074), Management Research Center of the University of Wisconsin- Milwaukee, and the National Science Foundation (ECS-8011916). I am grateful to Dr. Diptendu Sinha of the University of Notre Dame for his very substantial help in computational work and to Dr. D. J. McConalogue of the Delft University of Technology for providing us with his algorithm and software for its implementation.

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