Reliability and Profit Analysis of a Single-Unit System with Inspection under Warranty

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Abstract. The purpose of the present paper is to carry out reliability and profit analysis of a single-unit system considering the concept of inspection under warranty. Within warranty, failures are rectified by the manufacturer at no cost to the users provided warranty does not apply to product failure due to user-induced damage such as cracked screen, accident, misuse, physical damage, damage due to liquid and unauthorized modifications, etc. The cost to rectify failures beyond the warranty is borne by the users. After failure, unit goes under inspection within warranty. There is single repairman, which is always available with the system to do repair, inspection and replacement of the unit. Repairman inspects the failed unit to see the feasibility of its repair or replacement. If repair of the unit is not feasible, it is replaced by new one.The time to failure of the system follows negative exponential distribution while inspection and repair time distributions are taken as arbitrary. By using supplementary variable technique, various measures of system performance such as reliability, mean time to system failure (MTSF), availability of the system and profit function have been determined. The numerical results for reliability and profit function are also obtained in the form of tables for particular values of various parameters and repair cost.