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A Heuristic Stock Allocation Rule for Repairable Service Parts

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Abstract

In the present work, we investigate a repairable service parts inventory system that has a central repair facility and several locations storing inventory called bases. If a part fails, then the failed part is identified and replaced with a ready-to-use part from the base. Afterwards, the failed part is sent to the repair facility, where it is repaired and allocated to one of the bases, with the objective being to identify the base with the most urgent need of a service part to minimize the expected backorder cost. To achieve this, we examine the initial base-stock provisioning problem in conjunction with real time stock allocation decision making. By modeling the problem as a Markov decision process, we characterize the optimal solution for each decision and prove that identifying the optimal policy for one of the decisions leads to the optimal solution for the other. Considering the computational intensity of the multi-base problem, we propose a heuristic technique for the stock allocation problem based on relative value function and average backorder cost at a single base. Further, we compare the performance of the heuristic model with the myopic policy, which is widely applied in the literature, to