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串件拼修对策下两级备件维修供应系统动态管理模型

王慎, 李庆民, 彭英武

海军工程大学兵器工程系, 湖北 武汉 430033

Dynamic Management Model of Two-echelon Maintenance and Supply System for Spare Parts with Cannibalization

WANG Shen, LI Qingmin, PENG Yingwu

Department of Weaponry Engineering, Naval University of Engineering, Wuhan 430033, China

摘要

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摘要

在备件维修供应系统日常运作中,通过对库存和维修资源分配进行动态管理,能够在现有库存配置方案下提高保障效能。针对串件拼修对策下两级维修供应系统,分别建立了有限维修资源约束下多维修渠道故障件的送修和库存分配动态管理模型。根据备件库存动态分析模型(Dyna-METRIC)原理,建立了保障系统的蒙特卡罗仿真模型,并将动态管理模型嵌入其中。使用传统先到先服务(FCFS)原则和指定可用度目标确定不同初始库存配置方案,将这些方案作为仿真模型输入进行仿真试验。结果表明,采用本文模型后保障系统效能相比传统FCFS原则有了明显提高,证明了模型的正确性。

关键词: 库存管理 维修 动态模型 串件拼修 备件

Abstract:

During the daily operation of a maintenance and supply system for spare parts, dynamic management involved in the daily allocation for inventory and repair resources can improve support effectiveness with the current stock-configuration scheme. In order to achieve the same result in a two-echelon support system with cannibalization strategy, dynamic scheduling models are established respectively for inventory allocation and faulty item sequence in the multi-repair-channel under the finite repair resources constraint. A Monte Carlo simulation model is also built in line with the dynamic multi-echelon technique for recoverable item control (Dyna-METRIC) framework which is used for simulation analysis on spare parts inventory. The dynamic scheduling models are embedded in our simulation model for testing and verifying. Initial stock-configuration schemes are provided according to the traditional principle of first come, first served (FCFS) and assigned availability goals, then treated as the inputs of the simulation model for experiment. The results show that support effectiveness with dynamic scheduling models is much better than that with traditional FCFS principle, which proves the validity of the model.

Keywords: inventory management maintenance dynamic model cannibalization spare part

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Corresponding Authors: 李庆民, Tel.: 027-83442947 E-mail: licheng0001@hotmail.com Email: licheng0001@hotmail.com

About author: 王慎 男, 博士研究生。主要研究方向: 装备综合保障系统建模与仿真。 Tel: 027-83442753-7402 E-mail: wangshen_hust@163.com; 李庆民 男, 博士, 教授, 博士生导师。主要研究方向: 武器系统仿真、装备综合保障等。 Tel: 027-83442947 E-mail: licheng0001@hotmail.com

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