

Author's Accepted Manuscript

Heuristic Hybrid Game Approach for Fleet Condition-Based Maintenance Planning

Qiang Feng, Xiong Bi, Xiujie Zhao, Yiran Chen, Bo Sun



PII: S0951-8320(16)30515-4
DOI: <http://dx.doi.org/10.1016/j.ress.2016.09.005>
Reference: RESS5643

To appear in: *Reliability Engineering and System Safety*

Received date: 20 November 2015
Revised date: 10 August 2016
Accepted date: 18 September 2016

Cite this article as: Qiang Feng, Xiong Bi, Xiujie Zhao, Yiran Chen and Bo Sun Heuristic Hybrid Game Approach for Fleet Condition-Based Maintenance Planning, *Reliability Engineering and System Safety*, <http://dx.doi.org/10.1016/j.ress.2016.09.005>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting galley proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain

Heuristic Hybrid Game Approach for Fleet Condition-Based Maintenance

Planning

Qiang Feng^a, Xiong Bi^a, Xiujie Zhao^b, Yiran Chen^a, Bo Sun^{a*}

^aSchool of Reliability and Systems Engineering, Beihang University, Beijing 100191,
P.R.China

^bDepartment of Systems Engineering and Engineering Management, City University
of Hong Kong, Kowloon, Hong Kong

* Corresponding author. sunbo@buaa.edu.cn

Abstract

The condition-based maintenance (CBM) method is commonly used to select appropriate maintenance opportunities according to equipment status over a period of time. The CBM of aircraft fleets is a fleet maintenance planning problem. In this problem, mission requirements, resource constraints, and aircraft statuses are considered to find an optimal strategy set. Given that the maintenance strategies for each aircraft are finite, fleet CBM can be treated as a combinatorial optimization problem. In this study, the process of making a decision on the CBM of military fleets is analyzed. The fleet CBM problem is treated as a two-stage dynamic decision-making problem. Aircraft are divided into dispatch and standby sets; thus, the problem scale is significantly reduced. A heuristic hybrid game (HHG) approach comprising a competition game and a cooperative game is proposed on the basis of heuristic rule. In the dispatch set, a competition game approach is proposed to search for a local optimal strategy matrix. A cooperative game method for the two sets is also proposed to ensure global optimization. Finally, a case study regarding a fleet comprising 20 aircraft is conducted, with the results proving that the approach efficiently generates outcomes that meet the mission risk-oriented schedule requirement.

Keywords: Condition-based maintenance; Fleet maintenance planning; Hybrid game; Heuristic rule

1 Introduction

The traditional condition-based maintenance (CBM) research focuses on single aircraft state prognostic and maintenance time [1-7].

The objective of optimizing fleet CBM decision making is to arrange a maintenance plan to improve the availability of a fleet and to reduce maintenance consumption and mission risk [8-11].

Download English Version:

<https://daneshyari.com/en/article/5019553>

Download Persian Version:

<https://daneshyari.com/article/5019553>

[Daneshyari.com](https://daneshyari.com)