天基预警调度方法研究

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The scheduling model and algorithm of space based early warning

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摘要 作为一种复杂多传感器跟踪任务, 天基预警过程可视作一种多维离散时间序列监控与预测问题. 预警任务具有高实时性、动态性、高低轨配合、多星协作等特点, 因而调度模型需能够优化利用预警资源完成有效预警. 本文从实际问题出发, 主要阐述两项工作: 第一, 提出基于信息增益的多目标优化预警调度模型, 第二, 阐述免疫克隆选择算法, 并给出一种分布式并行调度求解方法, 以改善调度算法的收敛速度和鲁棒性, 解决实际需要. 最后, 通过基于HLA的仿真系统, 以美国SBIRS为背景, 验证了本文调度模型和算法的有效性.

关键词： 天基预警系统   卫星调度模型   卫星调度算法   克隆选择算法   智能优化算法

Abstract： As a kind of complex multi-sensor tracking task, the space based early-warning is the monitoring and predicting process with the property of the discrete time sequence. Early warning task exhibits many attributions, including high real time attribution, dynamic attribution, and multi-satellite corporation attribution, the satellites in the geosynchronous obits and the ones in low earth obit corporate to perform the function of missile early warning. The aim of the scheduling model is to perform early warning with high performance by effectively dispatching the available resources. Two sides of work are done in this paper, one is proposing the information gain based scheduling model, and another is the immune clonal selection algorithm is adopted to solve the model, and further the distributed parallel solving method is presented to provide a practical scheduling solution. This study is evaluated with our HLA based early warning simulation system, which refers the space based infrared system (SBIRS), the results verify the effectiveness of above methods.

Key words： space based early warning   satellite scheduling model   satellite scheduling algorithm   clonal selection algorithm   intelligent optimization algorithm

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[1]   姜维;李一军. 天基预警调度的启发式优化方法[J]. 系统工程理论实践, 2010, 30(10): 1834-1840.

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[2]　李彤; 王众托. 模拟植物生长算法在设施选址问题中的应用[J]. 系统工程理论实践, 2008, 28(12): 107-115.