

控制科学与工程

概率空域拥挤管理模型与方法

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摘要:

针对空域拥挤现象日益严重、管理策略与方法缺乏等问题,建立了空域拥挤预测模型和空域拥挤风险解决模型。采用预测模型预测未来可能产生拥挤的空域和时段,基于空域拥挤风险解决模型对具有高风险拥挤空域在预测时段内实施流量管理,在充分考虑延误成本、不同空域用户延误公平性及其对交通流影响程度等因素的情况下,有效降低拥挤风险。实际运行数据表明,所建立的空域拥挤预测模型和空域拥挤风险解决模型能有效地预测未来空域发生拥挤的时段,迅速找到适宜的拥挤解决策略,平衡运行风险控制与成本控制,为空中交通流量动态管理提供了新途径。

关键词: :空中交通 空中交通流量管理 风险预测 空域拥挤管理

Probabilistic airspace congestion management model and methodology

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Abstract:

There are still no effective airspace congestion management strategies and methodologies to solve seriously increased airspace congestion. An airspace congestion prediction model and an airspace congestion resolution model were established. The airspace congestion prediction model was used to forecast the time intervals in which the congestion occurred, and the airspace congestion resolution model was used to control the air traffic flow in the airspace with high risk congestion during predicted time intervals. The airspace congestion risk was reduced, and also some factors such as delay cost, delay equity of different airspace users and the influence to the air traffic flow were considered. Based on real flight data, simulation results showed that the two models could effectively predict the time of airspace congestion in the future, rapidly find out suitable strategies, and balance performance risk control and cost control, which provided an innovative new way for dynamic air traffic flow management.

Keywords: air traffic air traffic flow management risk prediction airspace congestion management

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