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## 基于模糊积分的航空发动机MTBF动态评估方法

### Dynamic assessment model for MTBF of aero-engine based on fuzzy integral

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中文关键词: [航空发动机](#) [可靠性指标](#) [故障强度](#) [模糊积分](#) [动态评估](#)

英文关键词: [aero-engine](#) [reliability targets](#) [failure intensity](#) [fuzzy integral](#) [dynamic assessment](#)

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中文摘要:

针对传统评估方法无法解决航空发动机可靠性评估的滞后问题, 采用模糊积分方法建立航空发动机动态可靠性评估模型. 引入故障强度因子, 建立降半正态型分布的故障强度因子函数表示故障纠正过程. 通过故障强度因子得到模糊密度, 采用Choquet模糊积分方法融合发动机各阶段可靠性指标, 解决了航空发动机可靠性指标的动态评估问题. 对在研的某小型涡扇发动机进行了应用研究, 结果表明采用Choquet模糊积分数据融合方法进行动态评估能考虑到不同阶段故障数据的重要性, 对发动机当前的可靠性水平能给予更加科学的评价.

英文摘要:

The lag problem of reliability assessment of the aero-engine was studied aiming at the limitation existed in the traditional assessment methods. The dynamic aero-engine reliability assessment model was established by using fuzzy integral method. Reasonably fault samples of every stage for data fusion were used, which were key issues of dynamic assessment for aero-engine reliability. The failure intensity factor was introduced. The failure rectification process was expressed by the low half normal distribution function of failure intensity factor. Fuzzy density was obtained by the failure intensity factor. The reliability targets of aero-engine were fused using Choquet fuzzy integral method. Dynamic assessment for reliability targets of aero-engine was realized. The research results were applied to the small turbofan engine. Using Choquet fuzzy integral data fusion method for dynamic assessment can take the importance of each stage fault samples in consideration. The method provides scientific evaluation for the aero-engine reliability.

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