

工程与应用

变速风力发电机故障观测器的设计和应用

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摘要 针对模型包含未知非线性函数的变速风力发电机故障诊断问题, 采用反卷法和最小二乘支持向量机对未知非线性函数进行辨识, 将辨识结果作为补偿项加入比例高阶积分观测器中, 消除未知非线性项对故障诊断精度的影响, 建立了基于最小二乘支持向量机非线性项辨识模型的比例高阶积分故障观测器。李雅普诺夫函数证明该故障观测器的稳定性, 仿真实验表明该故障观测器可以准确、快速、有效地诊断变速风力发电机故障。

关键词 [变速风力发电机](#) [最小二乘支持向量机](#) [补偿项](#) [比例高阶积分故障观测器](#)

分类号

Design and application of fault observer for variable speed wind turbine system

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Abstract

For estimating the fault signals of the variable speed wind turbine system with unknown nonlinear term, a robust fault observer is presented. The proposed fault observer uses Least Squares Support Vector Machine (LS_SVM) to obtain the recognition model of unknown nonlinear term. Then, the recognition model, which can reduce the diagnosis precision influence of unknown nonlinear part, is added to the proportional multiple-integral fault observer as the compensation model. The convergence of the proportional multiple-integral observer based LS_SVM compensation model is proved by Lyapunov function. Simulation results demonstrate the fast convergence and diagnosis precision of the proposed fault observer.

Key words [variable speed wind turbine](#) [least squares support vector machine](#) [compensation term](#) [proportional multiple-integral fault observer](#)

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