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Condition Monitoring of a Wind Turbine Gearbox Using the Empirical Mode Decomposition Method and Outlier Analysis

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Wind turbines are subject to variable aerodynamic loads and extreme environmental conditions. Wind turbine components fail frequently, resulting in high maintenance costs. For this reason, gearbox condition monitoring becomes important since gearboxes are among the wind turbine components with the most frequent failure observations. The major challenge here is the detection of faults under the time varying operating conditions prevailing in wind turbine systems.

This paper analyses wind turbine gearbox vibration data using the empirical mode decomposition method and the statistical discipline of outlier analysis for the damage detection of gearbox tooth faults. The instantaneous characteristics of the signals are obtained with the application of the Hilbert transform. The lowest level of fault detection, the threshold value, is considered and Mahalanobis squared-distance is calculated for the novelty detection problem.

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Ключевые слова:

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