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Prognostics and Diagnostics of Rotorcraft Bearings

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This paper presents a diagnostic and prognostic approach for rotorcraft bearing health monitoring using the Hilbert-Huang Transform (HHT). The HHT transforms a raw vibration data into in a two-dimensional time-frequency domain by extracting instantaneous frequency components within the signal through an empirical mode decomposition EMD process. EMD transforms the complex vibration signal into simple oscillatory modes called intrinsic mode functions (IMFs). Since the IMFs are obtained based on the local characteristic time scale of the data, they can be used to analyze the nonlinear and non-stationary bearing degradation processes. In performing diagnostic decisions, the work presented here uses the energy ratios of the highest two intrinsic modes and the respective marginal frequencies as condition indicative features. The approach has been tested using experimental data obtained from seeded spall and corrosion tests on AH-64 Apache hanger bearings.

Ключевые слова:

Содержание.
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