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”FDP2#3 - Noise robust gearbox defect diagnosis”

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“Vibratory analysis focused on the detection of periodically impulsive signatures caused by tooth crack of a gearbox in early stage is a great interest in industrial applications. This problem has received great attention in the last decades. A wide variety of model-based approaches requiring advanced methods for processing and analyzing the vibration signal for early fault detection have been proposed. For the vibration signal processing about gearbox fault diagnosis, the noise caused by data acquisition systems and other machine elements, must be properly filtered from the recorded vibration signal. A novel gearbox fault diagnosis method taking into account modeling errors of vibration signal, additive noises and the knowledge of the default frequency is proposed.

A new model of faulty vibration signal from those usually used for gearbox fault diagnosis is introduced. Then an optimal estimator, combining simultaneously the noise filtering of the recorded signal and the estimation of fault signal by a demodulation approach based on the least squares optimization, is determined. The new approach has been applied to faulty vibration signal and shown its robustness to measurement noise and its reliability for fault diagnosis.

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The problem of finding the optimal estimation of fault signal from a new model vibration signal has been addressed under constant speed conditions. It integrates an optimal strategy for noise filtering. The experimental results showed the robustness of the proposed gear fault diagnosis technique.”

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Classification par session : Survishno 8 / Fault Diagnostics and prognostics 2