Anti-friction bearing malfunction detection and diagnostics using hybrid approach

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ABSTRACT

Antifriction bearings are widely used in the industries especially in aircraft, machine tool, and construction industry. It holds and guides moving parts of the machine and reduces friction and wear. As they are one of the riskiest components in the rotating machinery, it puts challenges on the bearing health condition monitoring. The defects found in the bearings can lead to malfunctioning of the machinery and impact the level of production. This paper presents detection technique and diagnosis of bearing defects using a novel hybrid approach (continuous wavelet transform, Abbott–Firestone parameter, and artificial neural network). The vibration signals were obtained from Case Western Reserve University. MATLAB is used to analyse the vibration signals, test, and train the required models according to the chosen model structure. Various statistical features are extracted from the time domain namely kurtosis, skewness, root mean square, standard deviation, crest factor, and Abbott parameters to analyse and identify the bearing fault. The results demonstrate that the proposed method is effective in identifying the bearing faults.

KEYWORDS

Antifriction bearings; Rotating machinery; Condition monitoring; Detection; Diagnosis; vibration; ANN; Wavelet; Abbott parameters

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