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## Clustering Optimized Analytic Vibration Signal of Rolling Bearing Faults Using K- Means Algorithm

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**Abstract:** This paper presents a new method for the classification of vibration signals of bearings faults of induction motor using the time-frequency dependent class signal "RTFDCS". First, we have normalized the analytical vibration signals of bearing faults by Hilbert transforms. The vectors for extraction realized by RTFDCS. The Fisher contrast is used to design the nonparametric kernel RTFDCS that is deliberately designed to maximize separability between classes and minimize the intra-class variance and the optimization of the size of these vectors by the particle swarm optimization PSO algorithm. These processing results give us a separation between the classes that is validated by k-means clustering algorithm. The vibration data that were used for analysis are obtained from the Case Western Reserve University Bearing Data Center.

**Keywords:** Classification, Time-frequency representation, Bearing faults, Vibration signals, Hilbert transform, K- means algorithm.

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