

## **FEATURE EXTRACTION USING RECURRENCE QUANTIFICATION ANALYSIS WITH APPLICATION TO FAULT DIAGNOSIS**

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### **Abstract**

In this paper, a novel approach base on recurrence quantification analysis is developed for feature extraction from raw vibration data recorded from a rotating machine with five different conditions. The created features are then used as the inputs to a classifier for the identification of six bearing conditions. Experimental results demonstrate the ability of RQA to discover automatically the different bearing conditions using features expressed in the form of recurrence quantification measures. Furthermore, using RQA extracted features and traditional features with artificial neural networks (ANN) and support vector machines (SVM) have been obtained. This RQA-based approach is used for bearing fault diagnosis for the first time and exhibits superior performance over other traditional methods.

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**Keywords :** fault diagnosis; feature extraction; recurrence quantification analysis (RQA); machine condition monitoring (MCM)

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