

# Vibration signal-based bearing fault diagnosis using optimized multi-scale entropy and ANFIS network

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**Abstract :** This paper presents an application of a multi-scale classification method to detect bearing-related faults in an experimental benchmark. Multi-scale analysis of the vibration signal allows the representation of nonlinear dynamics and coupling effects between different mechanical components of industrial equipment. An improved multi-scale entropy analysis is used as features extraction tool for the diagnosis procedure. The classification of the state of health of the bearings is achieved using adaptive neuro-fuzzy inference system and neural networks for different faults scenarios with variable fault severity. Experimental results show the importance of the choice of the features extraction method for the classification of faults and the determination of their severity.

**Keywords :** Fault Diagnosis, Vibration analysis, multi-scale entropy (MSE), bearing faults