Development of a Visual Dot Pattern Technique of Signal for Fault Diagnosis

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ABSTRACT

In this thesis, an investigation of the fault diagnosis technique in internal combustion engines based on the visual dot pattern of acoustic and vibration signals is presented in this study. Acoustic emissions and vibration signals are well known as being able to be used for monitoring the conditions of rotating machineries. Most of the conventional methods for fault diagnosis using acoustic and vibration signals are primarily based on observing the amplitude differences in the time or frequency domain. Unfortunately, the signals caused by damaged elements, such as those buried in broadband background noise or from smearing problems arising in practical applications, particularly at low revolutions, are not always available. In the present study, a visual dot pattern technique is proposed to identify the acoustic emission and vibration signals for fault diagnosis in an internal combustion engine and drive axle shaft. Experiments are carried out to evaluate the proposed system for fault diagnosis under various fault conditions. The experimental results indicate that the proposed technique is effective in the fault diagnosis of an internal combustion engine and drive axle shaft.

Keywords : Fault diagnosis, Visual dot pattern, Internal combustion engine, Drive axle shafts

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