

عنوان مقاله:

Instantaneous Angular Speed (IAS) signal for abnormal combustion diagnosis in an I.C. engine

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خلاصه مقاله:

This paper is about the application of instantaneous angular speed (IAS) signal in a ۳-liter six-cylinder gasoline engine. The study is in continuation of former work in which a measurement system was developed for this signal on a rotating machine. The future trend of the research is to measure IAS in an I.C. engine. Therefore, the objective of the current work is to provide a verified software tool which can run simulated experiments with IAS signal output under healthy/faulty conditions. An engine model with detailed crankshaft elements is established in the GT-SUITE[1] software. Under the GT-SUITE environment, IAS signal output is obtained through simulated experiments. In order to validate the tool, the first torsional natural frequency of the crankshaft obtained from frequency analysis on the IAS signal is compared with the result of modal analysis on the crankshaft structure using the F.E. method. Also, the value is compared with the prediction from the GT CrankAnalysis module. A good match is found, which shows the validity of the developed software tool. Faulty condition of misfiring in one cylinder is simulated using this tool, and expected observations on the IAS output signal are verified to address the future trend of the research using the developed tool in this study.

کلمات کلیدی:

Instantaneous angular speed, I.C. engine, Torsional vibrations, Fault diagnosis

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