Real Time Car Engine Condition Monitoring By Using Instantaneous Angular Speed Analysis (IAS)

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Abstract

This project explains a technique that is reliable for condition monitoring of a car engine by applying instantaneous angular speed (IAS) analysis. The rotating of the crankshaft is affected by piston velocity that was derived in this report using the equation. The experimental work and the analysis discussed in this project provide a fine understanding of the damage effects on the instantaneous angular speed. Moreover, it is showing the details in crankshaft motion using angular motion technique. The optical encoder is used to acquire the angular motion data. The signals were obtained and analyzed in the phase domain using the signal averaging to determine fault and its position.
National Instruments hardware is used and NI LabVIEW software code is developed for real time. The sensitivity of optical encoders to pistons fault detection techniques is experimentally investigated by applying IAS analysis under different operating conditions.

Acknowledgment

Keywords

IAS - Instantaneous Angular Speed, condition monitoring and fault detection.

Biographies

Dr. Abdulrahman Sait is assistant professor at Mechanical Engineering Technology Department, Yanbu Industrial College (YIC). He started his profession by joining as Faculty member at YIC in 2000. He continued higher studies in Mechanical Engineering and earned his Bachelor of Science at South Dakota School of Mines and Technology, USA and thereafter Master and PhD in Mechanical Engineering from Florida Institute of Technology (FIT), USA. He presented his research work in dissertation titled as "Real-Time Condition Monitoring and Fault Diagnosis of Gear Train Systems Using Instantaneous Angular Speed (IAS) Analysis".

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