

DSP BASED FREQUENCY ANALYSIS FOR DETECTING STRUCTURAL DEFECT

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Abstract

Vibration is the mechanical oscillations of a structure about an equilibrium point. The location of the vibrating surface varies with time. Vibration is occasionally desirable such as from a tuning fork, or from a musical instrument but often vibration are caused by imbalances in the rotating parts, an affect i.e. generally undesirable. This is indication of wasting energy and creating unwanted noise. Machinery tends to have vibration modes with narrow peaks, or vibration and noise with repetitive patterns. Many vibrating systems in which if we sense vibrations and analyze it in frequency domain we can find out many properties like its fatigue life, dominant frequency, structural defects etc., which depends on the depth of analysis. Therefore, the FFT analyzer is a valuable tool for the troubleshooter or developer of machinery used in many areas from the identification of characteristics mechanical vibration frequencies to image enhancement. FFTs and the Power Spectrum are useful for measuring the frequency content of stationary or transient signals. FFTs produce the average frequency content of a signal over the entire time that the signal was acquired. Now a day DSP has given us many facilities to process the signal in frequency domain. The DSP, from free scale semiconductor has all the facilities which are necessary for data acquisition as well as analysis Like FFT, filtering etc, .It can be used for vibrating body of any two wheeler or four wheeler vehicle & DC or AC motor based platforms & after processing the data one can reach the desired conclusion. In this paper an attempt is made to study on the chassis of multi-cylinder engine of four wheeler under vibration environment in terms of its dominant frequency, energy level & other components.

Keywords: Accelerometer FFT, DSP, Free scale Software.