

PATTERN RECOGNITION BASED SHAFT ANGLE ENCODER

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ABSTRACT

The aim of this paper is to present the analysis of experimentally collected data acquired from the rotating shaft. The shaft surface was sensed by the non-contacting eddy-current probe using the home made robot. The robot consists of the controlled round table for object positioning and controlled arm for sensor. Two stepper motors are employed to control the movement of the probe in two perpendicular directions. The third motor drives the table with the rotor. The stepper motors are controlled by the micro-controller programmed from the PC. Using the probe and sensing the shaft surface pattern it is possible to obtain the image of rotor surface irregularities. These irregularities are unique due to applied sensors, rotor's material, and machining process quality. The surface irregularities can be analyzed and presented as a function of the rotor angle and/or angular velocity. The quality of the rotor surface pattern recognition is strongly influenced by the sensor characteristics and properties of the used data acquisition system. The methodology for the pertinent data analysis and possible applications are presented. Two rotor surfaces are measured in different conditions (e.g., rotations, sensor distance, etc.) and the obtained results are analyzed and compared.

Keywords: Encoder, eddy-current probe, pattern recognition.