Faculty of Electrical Engineering & Computer Science
Master Degree Course Electronics Engineering, MSc EE

HSB
Hochschule Bremen
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Master 2017

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Integrated Optical Absolute Encoder and Torque Meter.

ABSTRACT - Masterthesis

Researchers from the IPR research institute are developing a system that allows measuring the efficiency of mechanical system by determining torque and shaft position with the angle of rotation.

In many technical fields, torque and the absolute rotational angle of rotary systems are determined. Both metrics can be detected by using additional mechanical applications that need to be attached for example to a shaft which is costly. As a part of the project IntegrAD an optical structure to detect the torque and absolute rotational angle of a rotating shaft is implemented.

The most important goal of this thesis is the development and improvement of an existing electronic system for time-synchronized activation of the CMOS camera and LED. Moreover, a reference system is set up for torque measurement to validate the entire measuring system.

Synchronicity of the two cameras, synchronicity of FPGAs and the LEDs with cameras and the optical output of LED are the main three factors to be considered in this project. In addition, incorporation to the previously developed electronic system and implementation of the entire system in a PCB also should be considered.