Robot electronics EMB1 fall 2017
Lab 3 hand-in assignment
Anders Stengaard Sørensenand and Martin Skriver

Lab 3 hand-in assignment

This assignment is a bit different than what we are used to with lab assignments. Here you will do a lab exercise in teams and document it individually. To ease the workload for since you are handing in individually, you will not be asked to do a traditionally journal but simple fill in answers to the questions in this document. It is okay to share scope views and simulated tests with the teammates, but diagrams, description, evaluation and conclusions are individual tasks.

SPI position feedback

1. Create a block diagram showing your hardware design of the BLDC driver with SPI interface that shows the data flow and make a short description of the design and the individual blocks.
2. Create a port map of the hardware setup.
3. Show a picture of your hardware setup.

Brushed DC motor

1. Calculate the division of the clk signal and show simulation of the implemented PWM generator that confirms the frequency. Also, show a change in duty cycle and the simulated PWM output at 0 % and 100 % duty cycle.
2. Make a diagram or sketch a diagram showing the half bridges, the DC motor and the FPGA, and make a short description of the diagram and how it works.

BLDC motor

1. Show from simulation the sensor signal and the output for the BLDC motor. Describe the simulated result and the correlation between the sensor signals and motor output signals.
2. How many electrical revolutions does the motor run for one mechanical revolution and why are they not the same?

SPI position feedback

1. Create a state diagram of the SPI master state machine.
2. Show a oscilloscope view with the SPI clk and the MOSI signal.