Lab 3 - Speed Control Mode

Last modified by Mark Reynolds (/xwiki/bin/view/XWiki/MarkReynolds) on 2025/07/22 11:50

Purpose

In the previous Lab 2 session, we discovered that the life of a speed controller is not easy. So, let's give our brains a break and let the dsPIC33C family flex its computational muscles to handle the speed control task.

The Lab 3 demonstration features a sensorless Field Oriented Control (FOC) algorithm driving a Permanent Magnet Synchronous Motor (PMSM) (ACT) motor, now with both torque and speed control loops. You might notice that the speed controller is a bit slow—indicating room for improvement in its performance. In this lab, we'll focus on the tuning process to perk up our speed controller and get it running smoothly and effectively.

Procedure

1   Program Hardware (HW) and Connect With the Communicator

> The first part of the lab is the same as Lab 1. Please refer to Lab 1 if you require further guidance or clarification during the process.

1.1   Clear Lab 2: Close **X2C®**. Close **Scilab®**. Close the **project** within **MPLAB® X IDE**.

1.2   Open **mc_foc_ssl_fip_dspic33a_mclv48v300w.X** in MPLAB X IDE.

1.3   Open **Scilab**.

1.4   Navigate to the model directory **C:\...\mc_foc_sl_fip_float_dsPIC33A_mclv48v300w\project\x2cmodel** and execute the **initProject.sce**

1.5   From the model, start the Communicator.

1.6   Transform the model.

1.7   Generate the code and verify that the code generated sucessfully (X2C.c).

1.8   Compile and program from MPLAB X IDE.

1.9   From X2C Communicator, connect to the HW.

1.10   Open the **Scope** window.

1.11   Press **SW1** on the board to start the motor spin.

1.12   Use POT to change the speed. Apply some load. Note the behavior of the speed controller.

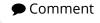> Visit the troubleshooting section if the motor does not spin.

♥ 0   Tags:

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