

Introduction

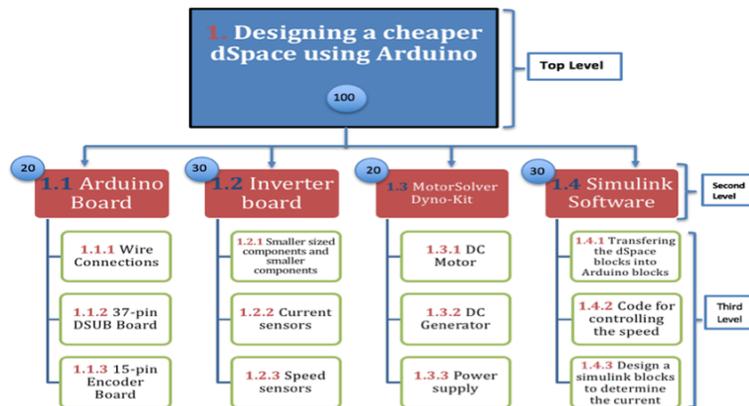
The project was to design a low-cost platform for electric drives experimentations by using Arduino control box. Arduino is preferable since the dSPACE platform used in the lab:

- Expensive hardware ~ \$4000
 - Expensive software ~ \$ 3000
- Arduino control board costs ~ \$100 and to design a controllable software, MATLAB Simulink is used. The client is Dr. Yaramasu, a assistant professor at North Arizona University.

The platform runs on four subsystems:

- Arduino board
- Inverter board
- MotorSolver Dyno kit
- MATLAB Simulink

Work Breakdown Structure



Contact

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Methods and Materials

Materials

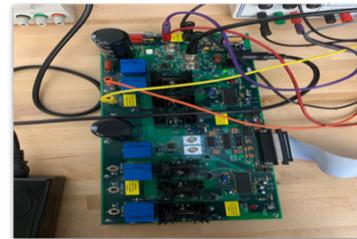
1. Arduino board
2. Inverter board
3. PCBs
4. MATLAB Simulink
5. MotorSolver Dyno-kit

Methods

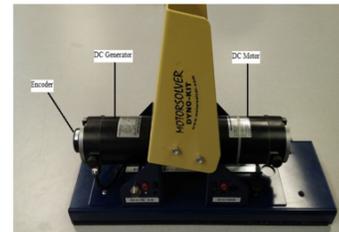
Arduino platform is used instead of dSPACE – to control output signals from the PCB (circuit board). PCBs are used to connect all the components together. MATLAB Simulink is used to control the speed of the DC motor and measure the current. The PCBs connection runs from the inverter board to the Arduino board and DC motor, and then from the Arduino board to the Simulink.



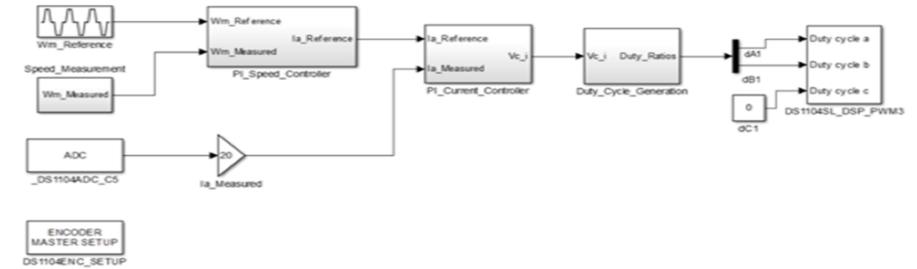
Arduino Board



Inverter Board



MotorSolver Dyno-kit



dSPACE Experiment in MATLAB Simulink

Discussion

The project motivation was to create a platform that is easy to use and easily accessible. The tests from Arduino platform when compared to dSPACE experimentations gave similar functionality. The main challenge was converting dSPACE experiments using Arduino, and changing Simulink files using Arduino packages. Hence, we converted MEGA Arduino to DUE Arduino.

Conclusions

From the project, it is evident that Arduino board can be used to create a low-cost platform for electric drives experimentation. This platform is used to implement dSPACE experiments and hence can reduce the cost of experimentation.

References

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4. S. Chaouch et al., "DC-Motor Control Using Arduino-Uino Board for Wire-Feed System," 2018 International Conference on Electrical Sciences and Technologies in Maghreb (CISTEM), Algiers, 2018, pp. 1-6. doi: 10.1109/CISTEM.2018.8613492
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