

## 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

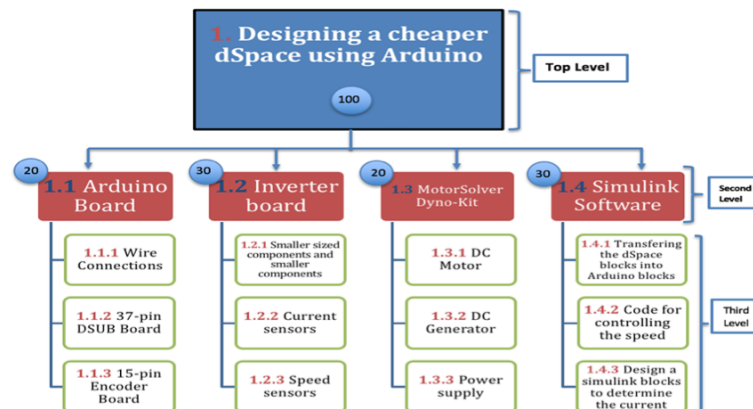
Arduino control board costs ~ \$100 and to design a controllable software, MATLAB Simulink is used.

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

858-281-3179  
928-679-5139  
928-380-2903  
310-236-5813

## Methods and Materials

### Materials

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

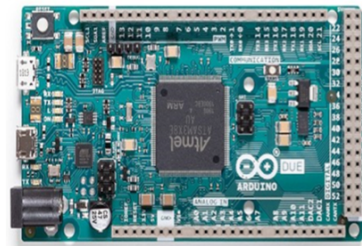
### Methods

Arduino platform is used instead of dSPACE – to control output signals from the PCB (circuit board).

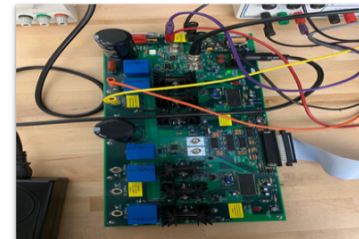
PCBs are used to connect all the components together.

MATLAB Simulink is used to control the speed of the DC motor and measure the current.

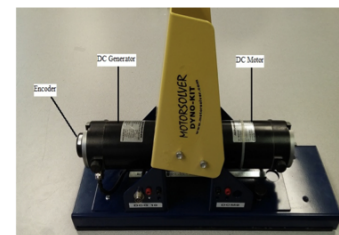
The PCBs connection runs from the inverter board to the Arduino board and DC motor, and then from the Arduino board to the Simulink.



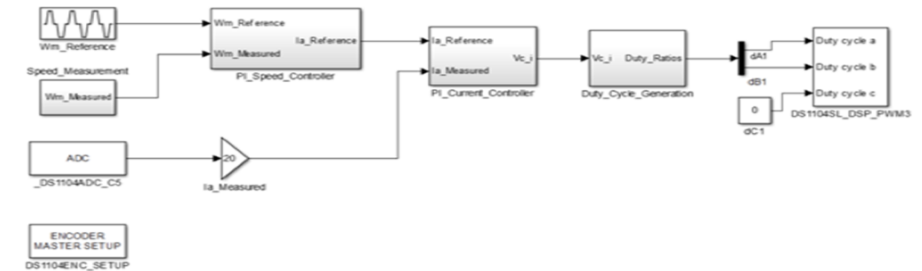
Arduino Board



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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3. J. Solignac's, P. Panagiotakopoulos, and E. Karapidakis, "Automatic Speed Controller of a DC Motor Using Arduino, for Laboratory Applications," Trivent Publishing © The Authors, 2016. <http://trivent-publishing.eu/>
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