Learning Brought to Life: Project Based Learning with Low-Cost Hardware Support

Low-cost hardware solutions are used in many applications such as quadcopters and mobile robots. Project-Based Learning is an approach to teaching that uses projects and trainer facilitation in place of trainer instruction. The projects are designed to encourage students to explore real world problems and create solutions for them. Low-cost hardware based solutions provide an effective platform to give students hands-on experience through Project-Based Learning and student competitions.

This tutorial workshop will provide a detailed walkthrough of the Model-Based Design process as applied to Project-Based learning. Using MATLAB and Simulink tools, we will demonstrate each step of the process for designing an embedded control system which will be implemented using Arduino and/or Raspberry Pi hardware. We will show how simulation can be used to model, identify and analyze the physical system and then we will design and validate a feedback controller using the simulated model. Finally, we will deploy the control algorithm to the low-cost hardware and validate the performance of the embedded system. We will conclude the tutorial with a discussion of how student competitions are using this approach to improve learning and student participation

The workshop will be led by Paul Cox, Applications Engineer from MathWorks, France and supported by Applications Engineers from OPTI-NUM solutions, representatives of MathWorks in Southern Africa