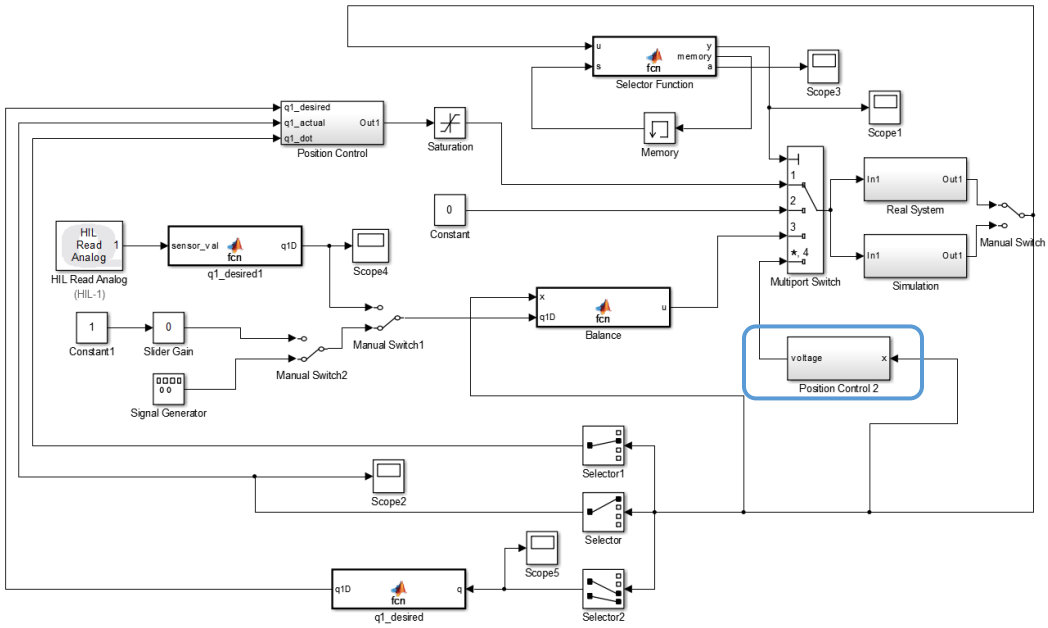
FL. 2018 ESE 447.02 Robotics Lab

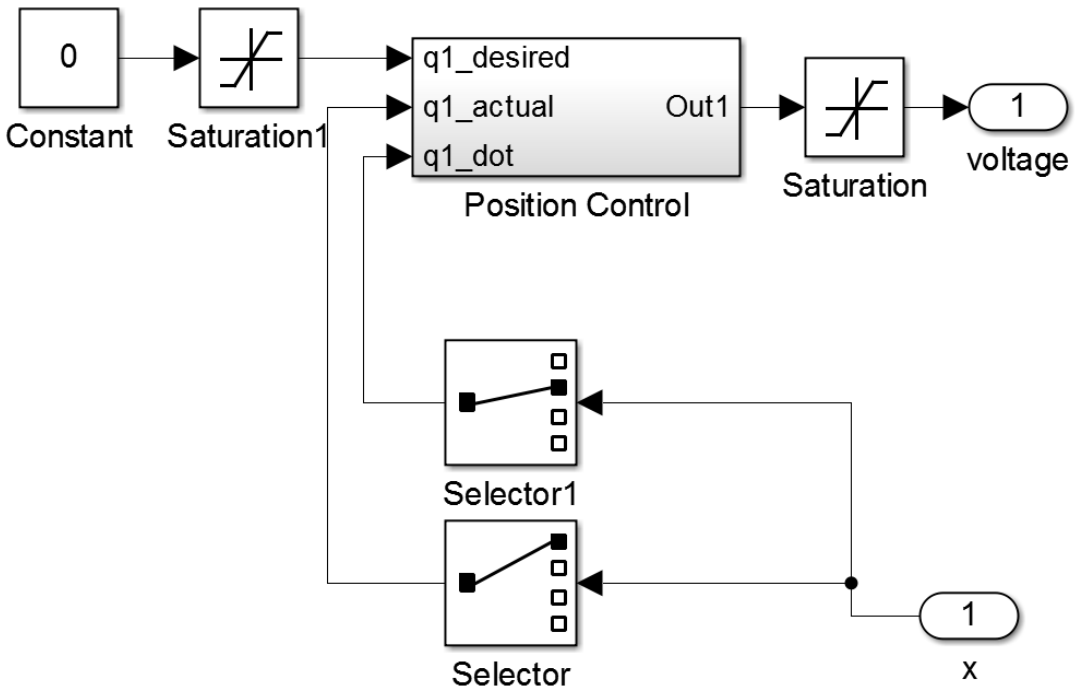
Lab Journal 20

12/4/2018

1. The fourth controller
   The fourth controller corresponds to the number 4 port on the multi-switch block. It was used to reset q1 whenever link 2 is knocked down from balancing or after the Simulation model being stopped. If we did not rotate link 1 to its initial position after running one cycle, the system would try to swing up from the new position and the performance of the swing up would be affected. To avoid this, we had to reset q1 at the end of each cycle, which is the reason why we introduced the fourth controller.

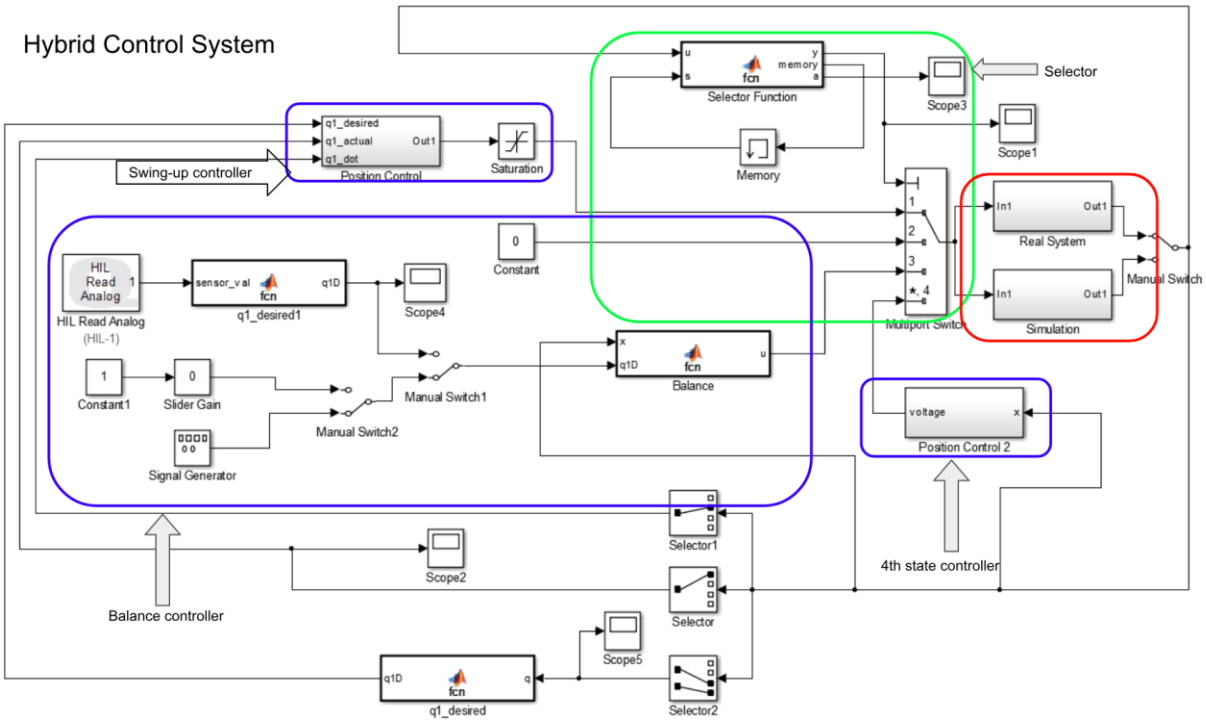


   The fourth controller is simply another controller for controlling q1, so it was very similar to the one we used for the swing-up controller. The difference is that the desired q1 is set to 0. The setup in the fourth controller is shown below.



The controller takes in the state variables and output a corresponding voltage that can set q1 to 0.

After the fourth controller was built, the whole model for the self-erecting inverted pendulum is then finished. The final model is shown below.



As circled in the picture, there are three main parts, the Real and Simulated Systems (red), the selector function (green) and the 4 different controllers (blue).