

SSY190: Homework 2

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1 IMPLEMENTATION

The plant and controller runs at different sampling times, 1 second and 100 milliseconds respectively. That means that for every reference point the plant provides 10 output values which are all computed using the same input; since we are applying the same input for a whole second, the output might increase or decrease depending on the plant parameters (not the tuning parameters of the controller).

For real time implementation, two threads were created, one for the plant and another for the controller. The output of the controller u and the output of plant y are shared variables between the two threads, thus we must ensure that only one of the threads are active at any given time. One also need to ensure that the controller runs prior to the plant using the initial value of plant Y_0 .

The code is attached together with this report, a semaphore \mathbf{s} is used as **Mutex** to ensure that only one of the threads are active at a time; and second semaphore is used to ensure that the controller runs first at the start of the loop. The sleep times are defined with accordance to the sampling times and that lets the plant runs 10 times after every successful execution of the controller.