Point 4 – Test stimuli (A. Floridia, R. Margelli)

This document provides details regarding the considerations we have drawn to generate the test set. The following represents the flowchart of the controller's step function:

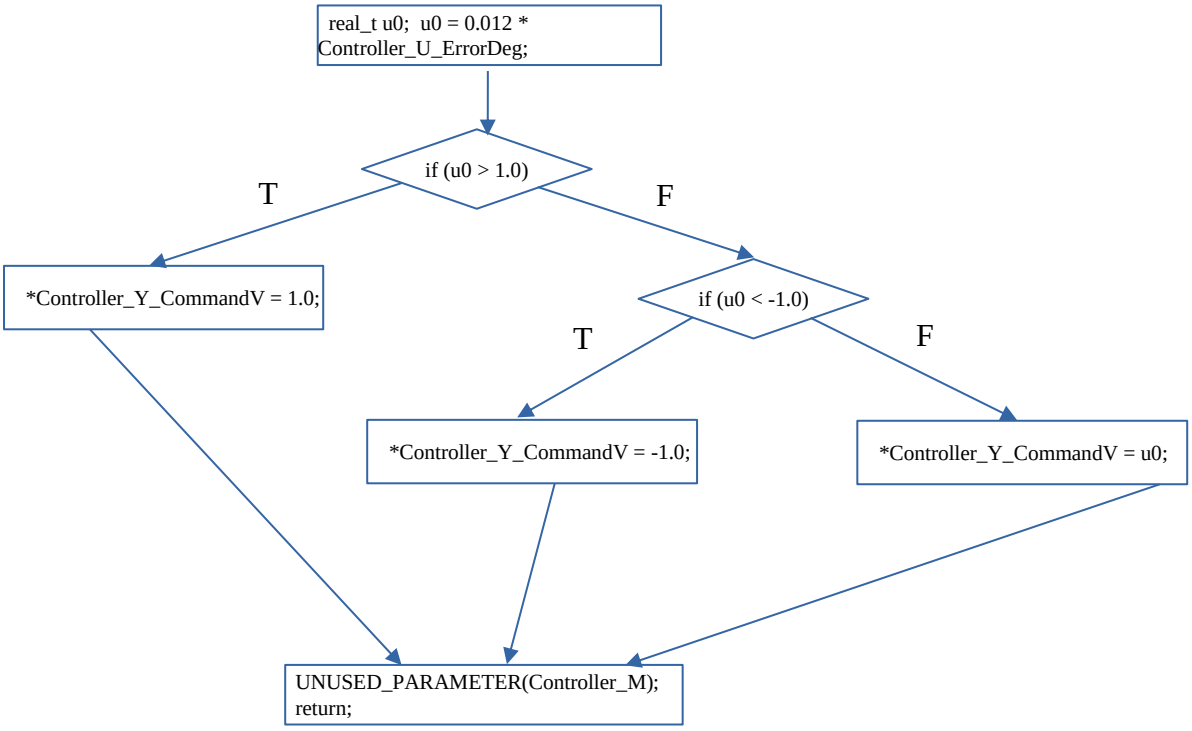

Figure 1 – Controller step function's flowchart

Based on common unit testing practices we focused on equivalence class partitioning and boundary analysis to reach 100% statement and branch coverage. There are 3 equivalence classes:

-] 1.0, MAX_real_T] ;
- [-1.0, 1.0] ;
- [- MIN_real_T, 1.0[.

Where with MAX_real_T and MIN_real_T we denote the maximum and minimum values a number of type real_T respectively.

Our test set is comprised of 6 values to be assigned to the Controller_U_ErrorDeg variable:
`83.333333333333333, 82, 84, -83.333333333333333, -82, -84.`
Once multiplied times the 0.012 constant the following values are obtained:
`1, 0.984, 1.008, -1, -0.984, -1.`

The Micrium project in folder /c contains the test set as a real_T type array. Its values are assigned step by step to the controller's input just before the step function is called.

In addition, to perform back-to-back testing between the MATLAB model-in-the-loop and the hardware implementation, we include a modified Simulink model where the responses from the model are logged automatically in a file. We compared values between the two scenarios and assessed the correct functionality of our implementation.