Objectives of the project

1   Program a Matlab script which computes the generalized predictive control algorithm. The Matlab function should provide the values of the linear time invariant controller for a specific choice of the design parameters (these design parameters should be the input parameters of the Matlab function and the polynomial of the controller are the outputs of the Matlab function).

2   Design a controller, using the previous Matlab script, which provides (if possible) the following closed loop performances

   a. Step like output disturbance rejection
   b. Insensitivity of the control variable as regards the noise measurements
   c. Step-like reference tracking without any bias
   d. Best compromise between the dynamics and the control variable magnitude
   e. Robustness : Modulus Margin > 0.5

The system to be controlled can be modelled by the following transfer function:

$$G(z) = z^{-1} \frac{0.0281 + 0.1278z^{-1} + 0.0513z^{-2} + 0.0013z^{-3}}{1 - 1.2254z^{-1} + 0.5711z^{-2} - 0.3507z^{-3} + 0.005z^{-4}}$$

Modulus Margin: Inverse of the H-infinity norm of the sensitivity function