

Parameters

December 4, 2023

1 Introduction

For assessing the performances of LMPC sampled data control and H2 optimal control we compared the quadratic costs of them . The constraints for the cost function include:

1.1 Parameters

- Total Time (T): $T = 10$ s
- State Weight Matrix (Q): $\mathbf{Q} = \text{diag}([1, 1, 1])$
- Control Weight Matrix (R): $\mathbf{R} = \text{diag}([0.1, 0.1])$
- Sampling Time (gamma): $\gamma = 0.1$ s
- Gain Matrix (k):

$$\mathbf{k} = \begin{bmatrix} 0.4662 & 0.2978 & 0.2067 \\ 0.8341 & 1.2165 & 1.3492 \end{bmatrix}$$

1.2 Quadratic Cost Function

The quadratic cost function for a single timestep is given by:

$$J_{\text{total}} = \sum_{k=1}^N (\mathbf{x}_k^T \mathbf{Q} \mathbf{x}_k + \mathbf{u}_k^T \mathbf{R} \mathbf{u}_k)$$

N = 2

Total Cost Value for LMPC J=10 : 8.98516268901749 and for H2 : 18.775862036811883