

# CH5120: Project 1 Report

Suhas Gundimeda, CH12B026

15th November 2015

**Note on running the MATLAB files: each of fmincon and quadprog have their own sets of files, run separately.**

## 1 Basic model

### 1.1 fmincon

All configuration is done in the objective function. The caller provides just the seed U values.

#### 1.1.1 Without minimizing $U^2$ objective.

Same objective function: 0.625

- 1.1.2 Different output controlled variables
- 1.1.3 Effect of  $x_0$ , control horizon, prediction horizon
- 1.2 quadprog
  - 1.2.1 Different output controlled variables
  - 1.2.2 Effect of  $x_0$ , control horizon, prediction horizon

## 2 Model with disturbance

- 2.1 fmincon
  - 2.1.1 Different output controlled variables
  - 2.1.2 Effect of  $x_0$ , control horizon, prediction horizon
- 2.2 quadprog
  - 2.2.1 Different output controlled variables
  - 2.2.2 Effect of  $x_0$ , control horizon, prediction horizon

## 3 Model with bias

- 3.1 fmincon
  - 3.1.1 Different output controlled variables
  - 3.1.2 Effect of  $x_0$ , control horizon, prediction horizon
- 3.2 quadprog
  - 3.2.1 Different output controlled variables
  - 3.2.2 Effect of  $x_0$ , control horizon, prediction horizon

## References

- [1] Bela G. Liptak (Editor) (2003). Instrument Engineers' Handbook (4th ed.). CRC Press. ISBN 0-8493-1083-0.
- [2] <http://nptel.ac.in/courses/Webcourse-contents/IIT%20Kharagpur/Industrial%20Automation%20control/pdf/L-25%28SS%29%28IAC%29%20%28%28EE%29NPTEL%29.pdf>
- [3] [http://www.controlglobal.com/assets/Media/0609/article\\_167\\_fig1.jpg](http://www.controlglobal.com/assets/Media/0609/article_167_fig1.jpg)
- [4] Balchen, Jens G., Dag Ljungquist, and Stig Strand. "State—space predictive control." Chemical Engineering Science 47.4 (1992): 787-807.