

A model predictive control approach for Some Application...

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Abstract—We study a model predictive control (MPC) approach for Some Application....

REFERENCES

- [1] J. Rawlings and D. Mayne, *Model Predictive Control: Theory and Design*. Nob Hill Publishing, 2008.

I. INTRODUCTION

Some Application is ... relevant for... The standard control strategy for Some Application is... which... cannot handle operational constraints... and/or may result in... non-optimal performance...

The systems dynamics are linear/nonlinear, ... where ... are the system states, ... are the control inputs, and ... are the system outputs.

II. MODEL PREDICTIVE CONTROL DESIGN

We consider a receding horizon MPC strategy with control horizon $N = \dots$

The state constraints are... hence can be represented in compact form as $Fx(k) \leq e$, where F is the matrix

$$F = \begin{bmatrix} * & * & 0 \\ * & * & * \\ * & * & * \end{bmatrix}$$

and e is the vector...

Control input constraints...

Output constraints...

We design the stage cost function $\ell(x, u) = \dots$, the terminal cost function $V_f(x) = \dots$, and the terminal set $\mathbb{X}_f = \dots$

III. ASYMPTOTIC STABILITY

In this section, we show that the designed MPC asymptotically stabilized the closed-loop system. With this aim, we verify the assumptions of Theorem... in the book [1]

Assumption 2.x: ...

Assumption 2.y: ...

IV. NUMERICAL SIMULATIONS

In this section, we run several numerical simulations where we compare some MPC controllers as well as standard controllers used in Some Application.

Since in Some Application, the state/output cannot be accurately measured, we assume the presence of a random measurement disturbance...

Plots... show the effect of shorter/longer control horizon... tuning the cost matrices... Compared with Standard Control, we observe that...

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