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The Creativity Exhebition

Two PID-Based Controllers for a tethered Segway on Dome Shaped Structures

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INTRODUCTION

Traditional Methods:

Scafolding
Using Ladder and Rope

Robotic Methods:

Magnetic Methods
Adhesive Materials
Suction Cup
Wheeled Robots (TUDTR)

THE TETHERED SEGWAY:

Robotic platform to move stable on the dome surface.

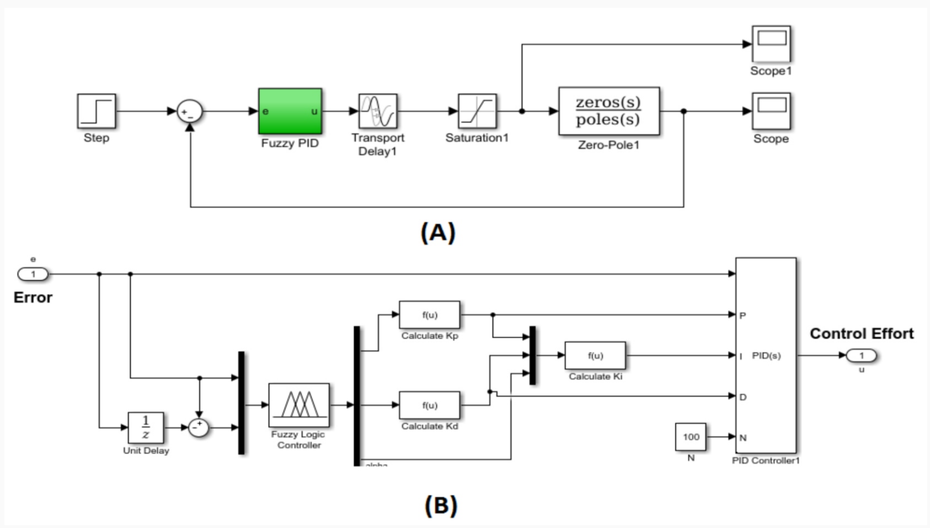
Challenges in Controlling UTDTR:

1. Parameters of the robots are not definitely measurable.
2. Environment may cause some changes in the model.
3. Dome's slop varies during the movement on the dome.

Contribution:

1. Design of a Fuzzy PID controller for UTDTR.
2. Design of a Gain-Sceduling MIMO Controller for UTDTR.

FUZZY PID:



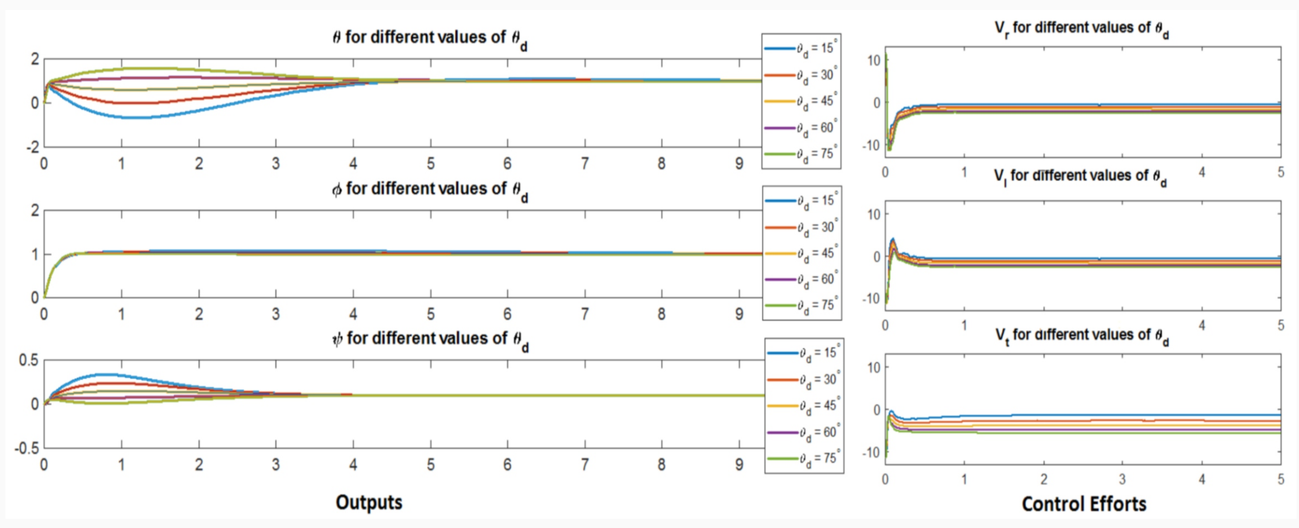
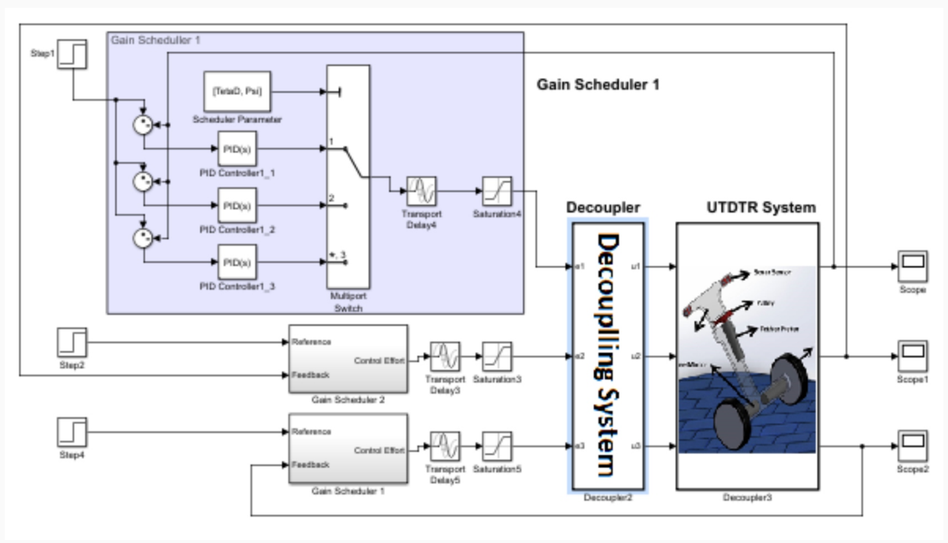


Figure 1. structure of a fuzzy PID controller for SISO system. (B) is detailed block diagram of Fuzzy PID block.

GAIN SCHEDULING CONTROLLER:



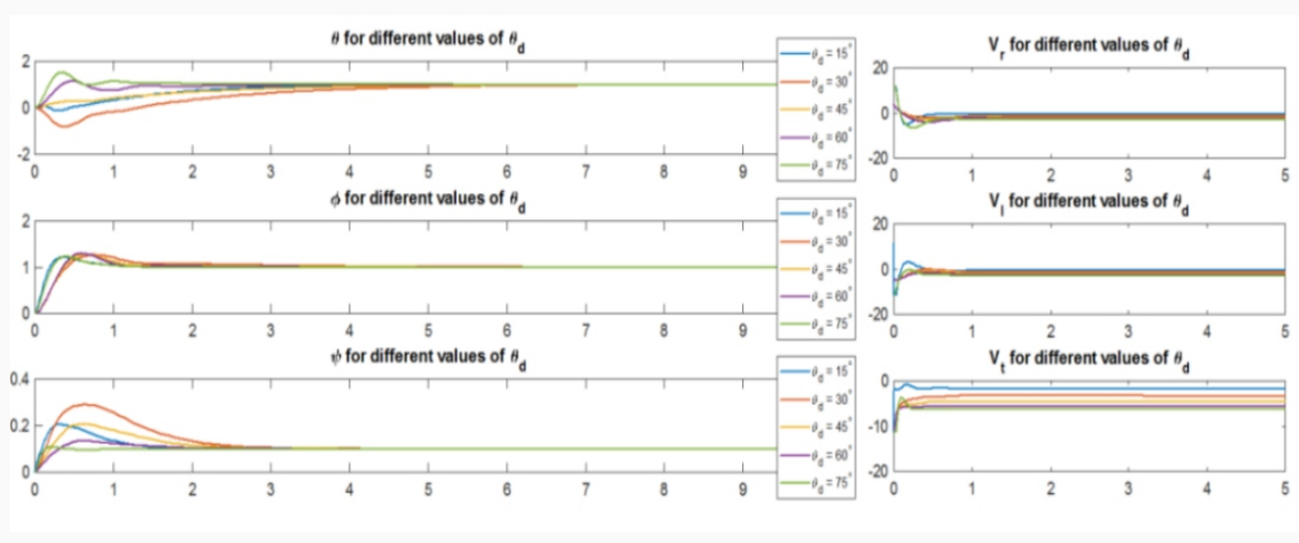


Figure 2. Closed-loop structure for UTDTR robotic system with PID-based gain scheduling controller