Adaptive Position Control of a Levitating Ball

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Abstract – insert abstract here.

Keywords – KeyWord1, KeyWord2, Some KeyWordPhrase Here

I. INTRODUCTION

Introduction here

II. problem description

Problem description here

iII. SySTEM DESCRIPTION

System description here.

|  |  |
| --- | --- |
|  | (1) |
|  | (2) |
|  | (3) |

iv. methodology

Methodology here.

A. MRAS Control

A model reference adaptive control was implemented with the model in (1) and controller in (2):

|  |  |
| --- | --- |
|  | (1) |
|  | (2) |

When compared with the system transfer function, the model following conditions are as follows:

|  |  |
| --- | --- |
|  | (3) |
|  | (4) |

Equations (1) and (2) are combined with the model following condition and system transfer function to yield derivative of the adaptation laws in (5) and (6):

|  |  |
| --- | --- |
|  | (5) |
|  | (6) |

The adaption rates and were obtained from finite difference equations. Initial values of and were set equal to the model following condition. Initial condition of their derivatives were set equal to zero.

|  |  |
| --- | --- |
|  | (7) |
|  | (8) |

B. Model Free Control

Model free control stuff here.

|  |  |
| --- | --- |
|  | (1) |

C. Other Controller

Other controller here

iv. TESTING AND RESULTS

Testing and results here

A picture containing chart

Description automatically generated

Fig. 1. Figure example here

Table 1. IEEE Table Caption

|  |  |  |
| --- | --- | --- |
|  | Your table |  |
|  |  |  |
|  |  |  |

V. DISCUSSION

Discussion here

VI. CONCLUSION

Conclusion here

REFERENCES

1. A. Tootchi, S. Amirkhani, and A. Chaibakhsh, “Modeling and Control of an Air Levitation Ball and Pipe Laboratory Setup,” in 2019 7th International Conference on Robotics and Mechatronics (ICRoM), Tehran, Iran, Nov. 2019, pp. 29–34. doi: 10.1109/ICRoM48714.2019.9071827.
2. D. Boase and C. Plante, “PID Family and Fuzzy Logic Control of Real Non-Linear System,” University of Ottawa, Apr. 2021.