Distributed and Networked Dynamic Resource Allocation, Scheduling, and Control Experiments

Nicanor Quijano and Kevin M. Passino

Department of Electrical and Computer Engineering
The Ohio State University
2015 Neil Avenue, Columbus, OH 43210-1272

March 5, 2004

Abstract

In this prelab you will learn about our laboratory experiments for distributed and networked dynamic resource allocation, scheduling, and control.

Contents

1 Introduction

In this pre-lab you are going to read the paper [1] and from there you will answer some questions to gain some insights into decentralized and networked dynamic resource allocation, scheduling, and control.

2 Questions

1. What is the main purpose of the paper?

2. What are the main challenges of each of the experiments described in the paper?

3. Why do we need "resource allocation" in the balls-in-tubes experiment? What is the resource? What constrains the allocation?

4. Describe briefly the strategies and results obtained for the balls-in-tubes experiment. Are these the best possible strategies? Can you suggest others that might perform better? Justify your claim

5. Why can we view the electromechanical arcade experiment as a feedback scheduling problem?

6. What are the differences between the two scheduling strategies implemented in the electromechanical arcade experiment? Why should one perform better than the other?

7. How does the networked delay affect the performance in the electromechanical arcade experiment?

8. From a resource allocation perspective the planar multizone temperature control problem is related to the balls-in-tubes experiment. How? How is it different?

9. How do the sensing topology and network delay affect performance for the planar multizone temperature control problem?

References

[1] N. Quijano, A. E. Gil, and K. M. Passino, "Experiments for decentralized and networked dynamic resource allocation, scheduling, and control," *Submitted for Publication, IEEE Control Systems Magazine*, 2004.