

**Indiana University-Purdue University
Indianapolis**
Department of Mathematical Sciences

STATISTICS SEMINAR

12:15pm—1:15pm, Tuesday, March 19, 2019
LD 265

Speaker: **Vahid Andalib**
Department of Mathematical Sciences, IUPUI

Title: **Reliability and Profit Evaluation of a PLC Hot Standby System Based on a Master-Slave Concept and Two Types of Repair Facilities**

Abstract:

Programmable Logic Controllers (PLC) are frequently used by a good number of companies like steel plants, etc. Various plants/companies use two PLC at a time: one operative, and the other as a hot standby to avoid big losses. Analysis of the reliability, and profit of a hot standby PLC system is of great importance; and hence the present paper examines such a system wherein two PLC are working in master-slave fashion. Initially, the master unit is operative, and the slave unit is in hot standby. The slave unit can also fail, but with a lower failure rate than the master unit. The master unit has the priority of operation & repair over the slave unit. While operating, the latest information from the master unit keeps on transferring to the slave unit. There are three types of failure: minor, major-repairable, and major-irreparable. The ordinary repairman who stays with the system repairs the minor failures. The expert repairman who is available upon demand repairs the major failures. Various measures of the system effectiveness, such as the mean time to system failure, steady-state availability, busy period of the ordinary as well as expert repairmen, expected number of replacements, etc. are obtained by using semi-Markov processes, and regenerative point techniques. Profit incurred to the system is evaluated, and a graphical study is also made. Real data from an industrial application is used in this study.