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IEEE Winnipeg Section

Carrier Wave

Fluid Power and Tele-Robotics Research Facility (Part I*)

Special points of interest:

- Fluid Power and Tele-Robotic Research Laboratory
- Embedded Systems Workshop Part II
- Communications Chapter Seminar
- Check our website regularly for upcoming event information

The fluid power research laboratory was established within the Department of Mechanical and Manufacturing Engineering in 1992. The goal was to conduct fundamental and applied research to improve control and enhance reliability in fluid power actuation systems. A wide range of applications are being considered: robotics (underwater/ mining hydraulic manipulators), manufacturing (injection molding), aerospace (flight control actuators), off-highway (excavator machines) and healthcare (pneumatic prostheses).

Fluid Power Research Laboratory at the University of Manitoba houses essential equipment to gain in-depth understanding of the dynamics, and develop advanced tools and supporting theories for robust control design and intelligent condition monitoring, of fluid power systems. Support for the infrastructure has come from many sources including Natural Sciences and Engineering Research Council of Canada, NSERC.

The facility has so far provided an infrastructure for more than 40 graduate students and visiting scholars, and 45 undergraduate students to perform world-class research. With supports from various granting agencies and local industry, the laboratory is now equipped with approximately $700,000 worth of equipment including a tele-operated UNIMATE hydraulic robot, a haptic-enabled seven degree-of-freedom open-control architecture KODIAK hydraulic robot, a hardware-in-the-loop flight simulator consisting of a fault emulating hydraulic actuator coupled with a loading actuator.

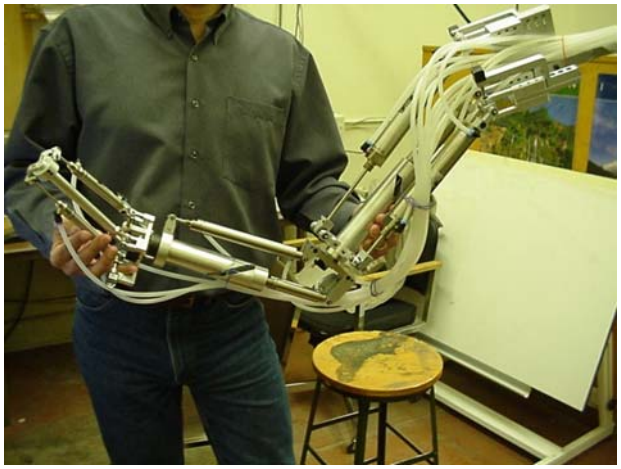
Fluid Power and Tele-Robotics Research Lab, E1 3rd Floor

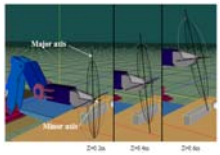
- Fluid Power and Tele-Robotic Research Laboratory

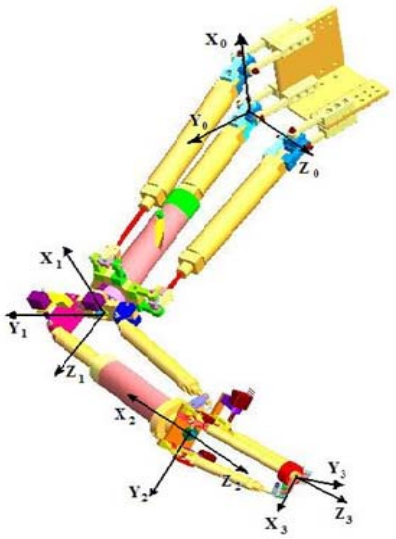
We have also designed and built a single axis hydraulic actuator for testing control algorithms applied to different valving systems. A second high performance hydraulic test rig was also constructed for studying contact transients and impact control research.

The laboratory also houses a pneumatic pick/place robot, a reconfigurable pneumatic test rig, a smart pneumatic process valve and a muscle-like pneumatically-activated arm.

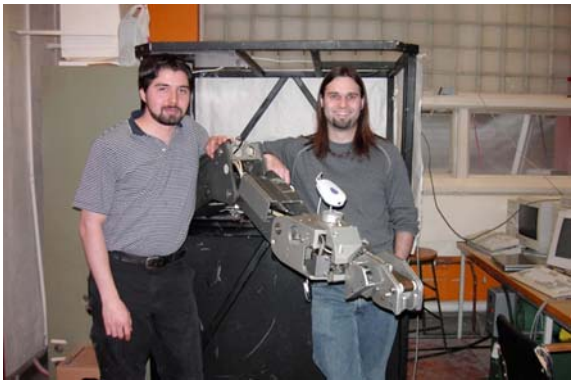
The test rigs, which are all interfaced with computers and equipped with commercial and in-house developed software packages, allow fundamental study of different control and condition monitoring algorithms applied to hydraulic actuators in either fully automated or tele-operated modes.







Seven degree-of-freedom hydraulic robot, interfaced with master arms- one with no force feedback, and one to provide force feedback. Graphics display system and computer interfacing allow operators move the robot in an interactive manner.



* Please see the part II of this article in the November Newsletter

- Embedded Systems Workshop Part II

This hands-on workshop is designed as a continuation of the beginners workshop held in October. A team of experienced mentors will use Code Composer Studio to demonstrate examples of:

- analog-to-digital conversions,
- handling input through push-buttons,
- using built-in timers,
- handling interrupts, and
- using a capacitive touch interface.

Speakers:
Craig Nemeth, Matthew Sebastian, Frank Serafin, Troy Denton, Matthew Woelk, Kiral Poon, Kane Anderson , Jonathan Aird, and Dario Schor.

Date:
Saturday, November 12, 2011 from 11:30-17:00

Location:
E3-558 EITC, University of Manitoba

Contact: For more information contact Dario Schor (VE4SCH) or Frank Serafin (VE4FHS).

- Communications Chapter Seminar

Title:
Scheduling in Wireless Networks with Flow Arrivals and Departures

Abstract:
Throughput-maximizing scheduling algorithms have been well-studied for wireless networks under the assumption that the number of flows in the network is fixed. In this talk, we will consider the impact of flow-level dynamics on the throughput and delay performance of wireless networks. First, we will describe traditional scheduling algorithms and identify the reasons for their poor performance in the presence of flow-level dynamics. Then, we will present new scheduling algorithms which significantly improve upon the throughput and/or delay performance of the traditional algorithms.

Speaker:
R. Srikant, Fellow IEEE
Fredric G. and Elizabeth H. Nearing Endowed Professor
Department of Electrical and Computer Engineering
University of Illinois at Urbana-Champaign, IL, USA

Date:
Wednesday, November 16, 2011 at 10am

Location:
Room E2-361, EITC, University of Manitoba, Fort Garry Campus

Contact: For questions or more information: Dr. Ekram Hossain 474-8908.

Acknowledgemen

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"In science one tries to tell people, in such a way as to be understood by everyone, something that no one ever knew before. But in poetry, it's the exact opposite."

Paul A. M. Dirac (1902-1984)

We're on the web!!
http://sites.ieee.org/winnipeg/

Message from the Editor

I would like to acknowledge the help of my predecessor, Dr. Alireza Foroozesh, in the transition of editors. Also, I would like to thank Dr. Sepehri and those of you that submitted information to me for this newsletter. I hope each one is a little better than the last.