



ONE DAY WORKSHOP ON RECENT DEVELOPMENT ON ELECTROHYDRAULIC SYSTEM AND CONTROL

30th September 2023

Organized by: Centre for Robotics and Mechatronics, NIT Meghalaya, India
In Collaboration with
IEEE Joint CSS-IMS Chapter, Kolkata, India

About NIT Meghalaya

The campus of NIT Meghalaya is located at Bijni Complex, Laitumkhrah at around 2 km from the Police Bazar, Shillong. The institute was established in the year 2010 with its permanent campus of about 450 acre being under construction at Shora, Cherrapunj. The institute consistently performs well with respect to publications, sponsored research, consultancy projects, student performance, ranking etc. The scenic panorama of the valley, the breathtaking local view points, spectacular landscapes and lakes have made the city one of the most popular destinations in the country. The nearest Umroi Airport, Shillong and LGBI Airport, Guwahati are respectively at distances of about 35 km and 130 km and the nearest Guwahati Railway Station is about 100 km from Shillong city. The temperature in the city during the period of FDP will be 15-22 °C.

About Centre for Robotics and Mechatronics

The center started in the year of 2017, with the faculty members from various departments like, Mechanical Engineering, Electrical Engineering, Electronics and Communication Engineering and Computer Science Engineering. The Center was officially inaugurated by Chairman, BoG, on 1st April 2019. The Center for Robotics and Mechatronics organized various workshop and training program in past. The Center for Robotics and Mechatronics offered finishing school programs for UK graduate students under the UKIERI program.

About IEEE Joint CSS-IMS Kolkata

The geographical area under the jurisdiction of IEEE Kolkata Section has several active groups in both the areas of Control Systems and Instrumentation and Measurement. In engineering domain and in industrial applications, Control and Instrumentation are very much interrelated and interweaved activities which motivated us to form this joint chapter. Several of these group members are IEEE members and some of them regularly publish in IEEE Transactions in the areas of Control and Instrumentation and Measurement. It had been a long standing wish of these members to form a joint IEEE CSS-IMS chapter and come together under the joint umbrella of IEEE CSS and IEEE IMS. Eventually, the joint IEEE Control Systems Society and Instrumentation & Measurement Society Chapter, IEEE Kolkata Section was formed in 2014. This chapter provides and will continue to provide a platform for regular, close knit interactions among academicians, researchers, and practicing engineers.

Contact:

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Organizing Committee

Patron:

Prof. Pinakeswar Mahanta, Director, NIT Meghalaya, India

Chairman:

Prof. Pinakeswar Mahanta, Director, NIT Meghalaya, India

Co-Chair:

Prof. Madhubanti Maitra, Jadavpur University, India, Vice-Chairman IEEE CSS-IMS

Coordinator:

Dr. B. K. Satkar, PIC, Centre for Robotics and Mechatronics, NIT Meghalaya, India

Organizing Committee:

Dr. Rakesh Roy, NIT Meghalaya
Dr. Bunil Kumar Balabantaray, NIT Meghalaya
Dr. Kishore Debnath, NIT Meghalaya
Prof. Anindita Sengupta, IEST Kolkata
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Prof. Jayanta Kumar Roy, Director, System Advance Technologies Pvt. Ltd. Kolkata, India
Prof. Munmun Khanra, NIT Silchar
Prof. Nirmal Murmu, Calcutta University, Kolkata
Prof. Subhajit Kar, Institute of Engineering and Management, Kolkata
Prof. Kaushik Das Sharma, University of Calcutta, Kolkata

Mode of Workshop:

The workshop will be conducted online mode.

Target Participants:

Faculty Members from UGC/AICTE approved institutions, Research organization, Research Scholars, PG Scholars, participants from Government Sector, Industries (Bureaucrats/ Technicians/ Participants from Industries etc.) and staffs



Registration:

Interested candidates may register using the following link (There is no registration fees required).

https://docs.google.com/forms/d/e/1FAIpQLSfyJkamCKRirJDGs20HNQ13hLRBhNxDbMcZvrQcTvaZhKb0zw/viewform?usp=sf_link

All registered candidates will receive Participation Certificates after attending the workshop.

Resource Person

	<p>Prof. Kaushik Das Sharma, Professor & Head, Department of Applied Physics, University of Calcutta</p>	<p>Title of the Talk: A Novel Disturbance Rejection Factor Based Stable Direct Adaptive Fuzzy Control Strategy Abstract: The lecture will discuss a unique disturbance rejection factor based design of direct stable adaptive fuzzy logic controllers for a class of non-linear systems with large and fast disturbances. The adaptive fuzzy controllers are realized by employing hybrid combinations of Lyapunov theory based local adaptation and harmony search algorithm based global optimization technique. These hybrid adaptive fuzzy controllers are designed with the objective of optimizing both the structure and free parameters of it with guaranteed stability and, at the same time, simultaneously achieving satisfactory tracking performance and disturbance rejection. The novelty of the proposed work lies in the fact that, in a bid to perform the disturbance rejection, the nature of the disturbance itself is used in designing the tracking control law.</p>
	<p>Dr. Jayanta Das Associate Professor, Department of Mechanical Engineering at IIT(ISM), Dhanbad</p>	<p>Title of the Talk: Energy saving in off-road vehicles using leakage compensation technique Abstract: The lecture will discuss on enhancing the energy efficiency of linear actuators used in heavy earth moving equipment, particularly in the booms of excavation equipment. Two hydraulic circuits are compared in terms of energy efficiency, with one using a conventional proportional directional control valve (PDCV) and the other using an innovative solution of proportional flow control valve (PFCV) with artificial leakage between the two ends of the actuator. The PFCV reduces energy loss in the form of heat by bypassing the extra flow from the pump during position control, unlike the PDCV that uses a pressure relief valve. The hydraulic circuit using PFCV is found to be 8.5% more energy efficient than the conventional circuit using PDCV. The lecture also discusses the position control of the actuator, which is achieved using a PID controller tuned by a fuzzy controller. The simulation of the hydraulic circuit is carried out using MATLAB/Simulink, and the results are compared with experiments. Overall, the proposed approach could lead to significant improvements in the energy efficiency of linear actuators used in heavy earth moving equipment, thereby reducing their environmental impact and operating costs.</p>

Program Schedule

Session	Theme	Timing
	Inaugural Session	06.00 PM -06.15 PM
Lecture-1	A Novel Disturbance Rejection Factor Based Stable Direct Adaptive Fuzzy Control Strategy	06.15 PM -07.30 PM
Lecture -2	Energy saving in off-road vehicles using leakage compensation technique	07.30 PM -08.45 PM
	Valedictory	08.45 PM - 09.00 PM

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