CENTRO DE INVESTIGACIÓN Y DE ESTUDIOS AVANZADOS DEL IPN

El ***Departamento de Control Automático***

invita cordialmente a su

Seminario Departamental

Advanced Neurodynamic Approaches to Planning and Control of Intelligent Robots

Prof. Jun Wang

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The Chinese University of Hong Kong

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Planta Baja del Depto. de Control Automático, CINVESTAV-IPN, Unidad Zacatenco, D.F.

Abstract: It is computationally challenging for dynamic optimization when optimization procedures have to be performed in real time to optimize the performance of dynamical systems. Neural networks can be implemented physically in designated hardware such as ASICs where optimization is carried out in a truly parallel and distributed manner. This feature is particularly desirable for dynamic optimization in decentralized decision-making situations arising frequently in robotics and control.
In this lecture, the historic review and the state of the art of neurodynamic optimization models and selected applications in robotics will be presented. Specifically, starting from the motivation of neurodynamic optimization, we will review various recurrent neural network models for optimization. It will be shown that many fundamental problems in robotics can be readily solved by using the neurodynamic optimization models. Specific applications will be highlighted for collision-free robot motion planning with obstacle avoidance, grasping force optimization for multi-fingered robotic hands, and motion control of mobile robot control.

Biography: Prof. Jun Wan is a Professor and the Director of the Computational Intelligence Laboratory in the Department of Mechanical and Automation Engineering at the Chinese University of Hong Kong. He received his Ph.D. degree in systems engineering from Case Western Reserve University, Cleveland, Ohio, USA. He is Associate Editor of the IEEE Transactions on Cybernetics and Associate Editor of the IEEE Transactions on Neural Networks. He is on the Board of Governors of the IEEE Systems, Man and Cybernetics Society. He serves in IEEE Fellow Committee and IEEE Computational Intelligence Awards Committees. He is an IEEE Fellow.