Public Seminar

Prof. Krzysztof Patan

Title (2 hours): Robust model predictive control: neural network approach

Room: 16

Abstract: The lecture is devoted to the model predictive control design by means of dynamic neural networks. As neural networks have huge possibilities to deal with nonlinear problems their application in the context of predictive control for nonlinear plants is highly reasonable. The first fundamental task that is discussed is to derive an accurate model of the plant. The problems of selecting a proper data as well as training process are portrayed. Moreover, the problem of dealing with the model uncertainty is also discussed. The uncertainty modelling can be also derived using neural networks. In this matter the so-called model error modelling is developed. Achieved robust model is used to formulate a constrained optimization in order to calculate a control sequence. The lecture discusses two solutions. The first one is to change the cost function in order to consider the robust model of the plant, while the second one is to impose constraints on the process output using derived uncertainty.

Speaker's Profile

Prof. Krzysztof Patan is Associate Professor at the Institute of Control and Computation Engineering, University of Zielona Góra, Poland. His research interests include artificial intelligence methods, especially dynamic neural networks, modelling of dynamic systems, model-based fault diagnosis, fault tolerant system design, global optimization methods and medical diagnosis. His research interests include stability and robustness of neural network model predictive control, fault tolerant control using state-space neural models, fault tolerant control using linear parameter varying models, time-frequency analysis methods in seizure classification.