

## **KIOS Distinguished Lecture Series**



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### *PID and Its Puzzles — MFAC and Progress*

#### **LECTURE ABSTRACT**

Many practical processes generate and store a huge amount of process data, which contains all the valuable information of the process operations and the equipment. How to use these process data, both on-line and off-line, to directly determine the controller structure, tune the controller parameter, design the output prediction, make the performance assessment, etc., would have great significance when the process models are unavailable. Therefore, the establishment on the data driven control theory is an urgent and important issue both for the theoretical development and field applications of the control theory. This talk includes four parts. The first is a brief survey on the existing problems of PID controller; The second is the dynamic linearization data modeling method for nonlinear systems; The third part will present the model free adaptive control (MFAC), including the indirect MFAC, the direct MFAC, and its progress; The final one is the MFAC application to a benchmark problem.

#### **BRIEF BIO**

Zhongsheng Hou (SM'13) received the Ph.D. degree from Northeastern University, Shenyang, China, in 1994. From 1995 to 1997, he was a Postdoctoral Fellow with Harbin Institute of Technology, Harbin, China. From 2002 to 2003, he was a Visiting Scholar with Yale University, CT, USA. From 1997 to 2018, he was with Beijing Jiaotong University, Beijing, China, where he was a Distinguished Professor and the Founding Director of Advanced Control Systems Lab, and the Head of the Department of Automatic Control. He is currently a Chair Professor with the School of Automation, Qingdao University, Qingdao, China.

His research interests are in the fields of data-driven control, model-free adaptive control, learning control, and intelligent transportation systems. Up to now, he has authored or co-authored more than 180 peer-reviewed journal papers and over 140 papers in prestigious conference proceedings. His works on data-driven learning and control has been supported by multiple projects supported by the National Natural Science Foundation of China (NSFC), including three Key Projects in 2009, 2015, and 2019, respectively, and a Major International Cooperation Project in 2012. Prof. Hou is the Founding Director of the Technical Committee on Data Driven Control, Learning and Optimization (DDCLO), Chinese Association of Automation (CAA), and is a Fellow of CAA.



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