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Keynote

Control of Wind and Water Turbines: Robustness and Practical Issues

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Abstract

New approaches and results will be presented on the control for robustness and optimal performance of wind and water turbines. The use of Linear Parameter Varying Methods for wind turbines has a well-established record. We will look at the use of such LPV systems for water turbines and their unique characteristics. In addition feedback control via L-1 Optimal and Piece Wise Affine methods for dividing the operating range into manageable regions to guarantee levels of performance or behaviour with respect to disturbances and nonlinearity will be presented. Collectively, these methods comprise a holistic approach to designing control for turbines over the dynamic range, the range of mechanical operation (pitch versus torque control), and levels of disturbances. Simulation results using advanced industry models will be demonstrated.

Biography

Prof. Jeff Pieper is an Associate Professor in the Schulich School of Engineering at the University of Calgary. He was educated at Queen's University and the University of California at Berkeley. He has experience in industrial control applications with Computing Devices, Defense Research and Development, Nortech Surveys, Malan's Automation, Canadian Light Source, New Energy, Smart Muffler, Revolve, and other companies. Jeff Pieper has provided consulting services for a variety of Canadian companies over the past several years. These projects include dynamic systems analysis, control interfacing and design and along with full-package control systems design work for alternative energy turbines, vehicle steering systems, inertial navigation systems, and helicopter flight control systems. He has interests in the design and analysis of control systems and mechatronics. Other research areas include the analysis of dynamic systems and the development of design methodologies for mechatronic systems.