

Tutorial session on

Control for Wind Turbines: the L-1 Optimal Approach

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Abstract

This tutorial will deal with the application to wind turbines of a novel solution for control system design. These control systems are an important component of current wind turbines: The L-1 Optimal control can provide a sense of optimality for feedback system performance in wind turbines, while guaranteeing levels of robustness in the presence of wind gusts. A novel solution presented in this tutorial limits the order of the resulting controllers, and provides significant improvements to the convergence speed for finding the controller coefficients, based on eigenvalue methods. A detailed tutorial application to a wind turbine system will be developed including discussion of how turbine dynamics, operating conditions, wind gusts and other factors can be taken into account for controller design.

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.