BIG energy seminar series

Addressing the scale and complexity of the global energy challenge.

High Reliability Monitoring and Control of Wind Turbines

Dr. Peter Seiler

University of Minnesota

Date: Tuesday, May 7th, at 3:30 PM
Location: ECEE Conference Room 1B55 (Engineering Center)

Abstract:

The use of wind power is rapidly increasing due to a demand for renewable energy resources. This growth has been achieved, in part, by moving to increasingly larger turbine designs. Unfortunately, tower and blade flexibility become significant at larger dimensions resulting in higher structural loads. This leads to additional failures, longer downtimes, and increased maintenance costs. This talk will focus on advanced monitoring and control methods to improve the reliability of wind turbines. First, the talk will review the current approach for safety-critical design in the aerospace industry. This will motivate a novel algorithm for detection of blade failures using sensors powered by energy harvestors. Finally, the talk will end with a framework for efficient design of robust multivariable controllers for increase power captured and mitigation of structural loads.

BIO:

Dr. Seiler received his Ph.D. from the University of California, Berkeley in 2001. His graduate research focused on coordinated control of unmanned aerial vehicles and control over wireless networks. From 2004-2008, Dr. Seiler worked at Honeywell on various aerospace and automotive applications including the redundancy management system for the Boeing 787, sensor fusion algorithms for automotive active safety systems and re-entry flight control laws for NASA's Orion vehicle. Since joining the University of Minnesota in 2008, Dr. Seiler has been working on model-based fault-detection and robust control techniques with applications to wind turbine control.

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