



CREW Seminar Series: Spring 2011

Adaptive Control of Utility-sized Wind Turbines in Operating Regions 2 & 3

Abstract

The next generation of utility-scale wind turbines will be larger and more flexible than earlier designs to promote greater energy capture and reduce the cost of energy. It is here that the implementation of active feedback control is crucial to meet design objectives. Not only must there be power regulation or optimization but also load mitigation to extend the life of the turbine.

Typically wind turbines are considered to be operating in one of two fundamental regions: Region 2 well below rated power and Region 3 very near rated power. Turbines often transition between these two regions, as well.

Active control is a relatively new technology for wind turbines. The lack of precise knowledge of the unsteady aerodynamics and structural dynamics of wind turbines leads to a need for sophisticated adaptive control capability in all regions of operation.

This talk will be a control specialist's point of view on large wind turbines, but will provide enough general background so as to be not deadly boring. We hope.

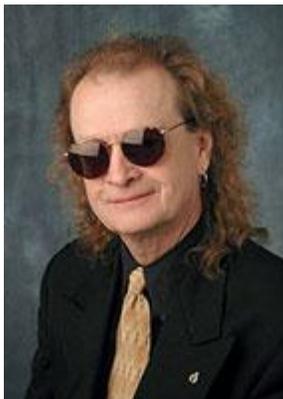
By Mark Balas from University of Wyoming

On Monday, January 31, 2011, at 2:00pm

Natural Environmental Sciences Building, Room B101

Colorado State University

Refreshments will be available at 1:50pm



Dr. Mark Balas is the Guthrie Nicholson Professor of Electrical Engineering and Head of the Electrical and Computer Engineering Department at the University of Wyoming. He has the following technical degrees: PhD in Mathematics, MS Electrical Engineering, MA Mathematics, and BS Electrical Engineering. He has held various positions in industry, academia, and government. Among his careers, he has been a university professor for over 30 years with RPI, MIT, University of Colorado, and University of Wyoming, and has mentored 39 doctoral students. He has over 300 publications in archive journals, refereed conference proceedings and technical book chapters on control theory and applications. He has been visiting faculty with the US Air Force Research Laboratory-Kirtland AFB, the NASA-Jet Propulsion Laboratory, The NASA Ames Research Center, and is the Associate Director of the University of Wyoming Wind Energy Research Center and adjunct faculty in the School of Energy Resources. He is a fellow of the AIAA and a life fellow of the IEEE. When he grows up, he would like to race motorcycles.



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Colorado State University Campus Fort Collins, CO

Building 45 is the 'Natural and Environmental Sciences' building



Directions to suggested parking, i.e., Directions to the **Lory Student Center (building 68)**

From Interstate 25, exit at Prospect Road (#268). Travel west on Prospect approximately 4 miles to College Avenue (passing major intersections at Timberline Road and Lemay Avenue). At College Avenue, turn right (north). Continue north approximately three-quarters of a mile to Laurel Street, turn left (west), and travel west three-quarters of a mile to Meldrum Street (the second stop light), and turn left into the Lory Student Center parking lot.

- **Parking at a meter** - The Lory Student Center parking lot includes metered spaces that are enforced from 7:30a.m to 4:00pm., Monday through Friday, except for University Holidays and semester breaks. Visitor permits are not valid at meters during enforced hours - the posted fee must be paid during all enforced hours.
- **"A" zone parking** - The "A" zone spaces require a permit to park from 7:30 a.m. to 4:00 p.m. Monday through Friday (except for specially signed portions of "A" zones which are enforced until 7:00p.m.), except for University Holidays and semester breaks. Information on parking services and/or purchasing a visitor permit is available at: <http://parking.colostate.edu/index.asp?url=Others>

Looking forward to your attendance!

