

– Announcement – A New Principle in Engineering

$$\int_{\text{classical}}^{\text{modern}} (\text{“Feedback-Control”} + \text{“Structure-Design”}) dt = \text{“Smart-Structures”} \\ \text{w/Amazing Capabilities}$$

- **Where?** UAH, Engineering Bldg. Room 258 (2nd Floor)
- **When?** Tuesday Evening March 12th, 2013 at 5:30 PM
- **Who?** All Interested Persons are Invited
- **Speaker?** Prof. Bob Skelton, UC/San Diego, a distinguished pioneer in the field

Integrating Structure and Control Design with Tensegrity Systems

A talk by Dr. Robert Skelton, UC/San Diego

Abstract

Universities typically teach structure design and control design as separate independent subjects, but the control energy required to meet shape and vibration control requirements can be greatly reduced by integrating structure and control design. New approaches to structure and control design are discussed, where the goal is to achieve the smallest structural mass and the smallest control energy, subject to dynamic and static performance constraints. The minimum control energy issue requires a resolution of the Information Architecture problem, where the choices of control law and sensor precisions and sensor locations are also integrated. The minimum mass issue requires tensegrity type structures, where all structural members are axially loaded. The nonlinear dynamics of all tensegrity structures are given, as well as the minimal mass solution for the Primary Structures (with compressive, or tensile, or bending boundary conditions), and nonlinear controls to maintain shape control. Examples include space habitats, wings, and 80 meter telescopes.

About the Speaker

Dr. Robert Skelton is the inaugural Alspach Professor of Dynamics and Control at UCSD, a member of the National Academy of Engineering, a Fellow of IEEE, a Fellow of AIAA, a Humboldt Fellow. Recipient of the Nichols Medal of ASCE, the Senior Research Award from Japan Society for the Promotion of Science, the Springer Visiting Chair from Berkeley. He was member of the Aeronautics and Space Engineering Board of the NRC, the EIRR panel for Hubble repair missions. Designed control systems for SKYLAB and Hubble space Telescope. Author of Dynamic Systems Control [Wiley, 1988], A Unified Algebraic Approach to Control Design, [Taylor & Francis 1998], Tensegrity Systems [Springer 2010].