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**Colorado State University's  
Information Science and Technology Center (ISTeC)  
presents two lectures by**



**Dr. Gerald T. Heydt**  
**Regents' Professor**  
**Arizona State University**  
**Department of Electrical, Computer,**  
**and Energy Engineering**

**ISTeC Distinguished Lecture  
in conjunction with the  
Electrical and Computer Engineering Department and  
Computer Science Department Seminar Series**

**"Mathematics of The Hilbert Transform: An Aircraft  
Autopilot, Power Engineering Dynamic Assessment,  
and Other Applications -  
Plusses, Minuses, and Reflections"**

**Monday, October 10, 2011**

Reception: 10:30 a.m.

Lecture: 11:00 – 12:00 noon

Location: Lory Student Center Room 216



**Electrical and Computer Engineering Department Seminar**  
*sponsored by ISTeC*

**"Some Concepts in Power  
Distribution System Enhancements"**

**Monday, October 10, 2011**

Lecture: 3:00 p.m.

Location: Engineering E205

## **ABSTRACTS**

### **“Mathematics of The Hilbert Transform: An Aircraft Autopilot, Power Engineering Dynamic Assessment, and Other Applications - Plusses, Minuses, and Reflections”**

The presenter will give a brief history of why he became interested in the Hilbert transform. The transform itself shall be defined and a summary of its general mathematical properties shall be given. The analytic function shall be introduced since many of the most important engineering and dynamic signal applications are related to the analytic function rather than the Hilbert transform itself. Applications described will include general feedback control systems, aircraft autopilots, and electric power engineering dynamics. The contemporary challenges of the Hilbert transform shall be described including the application of Bedrosian's theorem, and the Hilbert – Huang method. Some recent results related to the Hilbert transform shall be described. Some work presented was supported by the Power Systems Engineering Research Center and the U. S. Department of Energy.

### **“Some Concepts in Power Distribution System Enhancements”**

Power distribution systems have often occupied somewhat of a backwater of power engineering. However the publicity of the 'Smart Grid' program has resulted in a new focus on distribution systems. In this presentation, a few new subject areas are discussed. Some of these ideas are adapted from transmission engineering, and some are from power marketing. The concept of state estimation for power distribution systems is described, and some preliminary ideas on applications will be given. Reliability shall be revisited including the calculation of excess capacity of service, primary networking, secondary networking, and automated restoration of service after an outage. Direct digital control is proposed for the restoration application. Some ideas on energy storage in distribution systems will be given. The talk concludes with a novel idea on locational marginal pricing for distribution systems. Some of these issues in distribution engineering arise from recent funded research by the National Science Foundation and the US Department of Energy.

## **SPEAKER BIOGRAPHY**

**Gerald T. Heydt** (heydt@asu.edu) received the BEEE degree from the Cooper Union in New York in 1965, and the MSEE and PhD from Purdue University, West LaFayette, Indiana in 1967 and 1970 respectively. He has industrial experience with the Commonwealth Edison Co., Chicago, and the United States Atomic Test Site in Mercury, NV. He also has experience with E. G. & G. in Las Vegas, NV. Dr. Heydt is interested in power systems, power distribution, renewable resource integration, and power engineering education. He is the site director of two NSF supported centers: the Power Systems Engineering Research Center and the Future Renewable Electric Energy Distribution Management center. Dr. Heydt is a member of the National Academy of Engineering, and he is a Fellow of the IEEE. He is an instrument rated private pilot and advanced amateur radio operator with license WB9SJW. He is presently a Regents' Professor at Arizona State University, Tempe AZ.

**To arrange a meeting with the speaker**, please contact Dr. Siddharth Suryanarayanan at (970) 491-4632 or [suryanarayanan@gmail.com](mailto:suryanarayanan@gmail.com).

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