

ELECTRICAL & COMPUTER ENGINEERING SEMINAR

“Polarization Ellipse Analysis of Nonstationary Random Signals”

by

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LSC Grey Rock Room

Abstract & Biography

Abstract. I present a novel way of extending rotary-component and polarization analysis to nonstationary random signals. If a complex signal is reconstructed from counterclockwise and clockwise rotating phasors at one particular frequency only, it traces out an ellipse in the complex plane. Rotary-component analysis characterizes this ellipse in terms of its shape and orientation. Polarization analysis looks at the coherence between counterclockwise and clockwise rotating phasors and whether there is a preferred rotation direction of the ellipse (counterclockwise or clockwise). In the nonstationary case, this ellipse is replaced with a time-dependent local ellipse that, at a given time instant, gives the best local approximation of the signal from a given frequency. This local ellipse is then analyzed in terms of its shape, orientation, and degree of polarization. A time-frequency coherence measures how well the local ellipse approximates the signal.

Biography. Peter Schreier is currently a Senior Lecturer in the School of Electrical Engineering and Computer Science at the University of Newcastle, New South Wales, Australia, which he joined in July 2004. Peter was born in Munich, Germany, in 1975. He received the M.S. degree from the University of Notre Dame, IN, in 1999, and the Ph.D. degree from the University of Colorado at Boulder in 2003, both in electrical engineering. During the Fall semester of 1998, he was a visiting research student with the Coding Group at the University of Hawaii at Manoa. In 1999-2000, he was a Research Fellow with the Optical 3D Metrology Group at Friedrich-Alexander-Universität Erlangen, Germany. During the Spring semester of 2004, he was a Postdoctoral Research Associate with Colorado State University, Ft. Collins. He is currently a Visiting Associate Professor with Colorado State University.

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