

Statistical Signal Processing of Complex-Valued Data – The Theory of Improper and Noncircular Signals

Schreier, Peter J. and Louis L. Scharf. *Remarkable Engineers - From Riquet to Shannon*. New York, NY: Cambridge University Press, 2010, 309 pp. \$95.00 (Hardbound).

Complex-valued random signals are embedded into the very fabric of science and engineering, yet the usual assumptions made about their statistical behavior are often a poor representation of the underlying physics. This book deals with improper and noncircular complex signals, which do not conform to classical assumptions, and it demonstrates how correct treatment of these signals can have significant payoffs.

The book begins with detailed coverage of the fundamental theory and presents a variety of tools and algorithms for dealing with improper and noncircular signals. It provides a comprehensive account of the main applications, covering detection, estimation, and signal analysis of stationary, nonstationary, and cyclostationary processes.

Providing a systematic development from the origin of complex signals to their probabilistic description makes the theory accessible to newcomers. This book is ideal for graduate students and researchers working with complex data in a range of research areas from communications to oceanography.

Peter J. Schreier is an Associate Professor in the School of Electrical Engineering and Computer Science, The University of Newcastle, Australia. He received his Ph.D. in electrical engineering from the University of Colorado at Boulder in 2003. He currently serves on the Editorial Board for the IEEE Transactions on Signal Processing, and on the IEEE Technical Committee Machine Learning for Signal Processing.

Louis L. Scharf is Professor of Electrical and Computer Engineering and Statistics at Colorado State University. He received his Ph.D. from the University of Washington at Seattle. He has since received numerous awards for his research contributions to statistical signal processing, including an IEEE Distinguished Lectureship, an IEEE Third Millennium Medal, and the Technical Achievement and Society Awards from the IEEE Signal Processing Society. He is a Life Fellow of the IEEE.