

MSEE Scholarly Paper Presentation
Single-Snapshot Adaptive Array Processing
By Songshun Xu

Advisor: Dr. Kathleen E. Wage

Co-Advisor: Dr. Jill K. Nelson

Friday, May 30, 2008, 3:00PM

Science and Technology II Room 230A

Abstract

Most adaptive array processing algorithms, for example, minimum variance distortionless response (MVDR) and MUSIC, require calculation of the covariance matrix of the received signals. These algorithms perform very well when an accurate estimate of the covariance matrix is available, otherwise their performance suffers significant degradation. There exist situations where covariance matrix estimates are unreliable, e.g., non-stationary environments where source signals are moving or applications where real-time processing is critical. When there are not enough snapshots available covariance-matrix-based algorithms do not produce good results for array processing and may fail in the case of single snapshot. Thus, it is necessary to turn to other non-covariance-matrix-based algorithms when small numbers of snapshots are available. In this scholarly paper, various single-snapshot algorithms for adaptive array processing are explored and their performance is analyzed and compared.