Seminar

Department of Mathematics

Cross Ambiguity Functions and Estimation of Time Delay and Doppler Shift

by

Professor Say Song Goh
National University of Singapore, Singapore

Abstract

The standard approach for joint estimation of time delay and Doppler shift of a signal is to estimate the point at which the cross ambiguity function of the original and modified signals attains its maximum modulus. We shall present a fast and accurate method on band-limited signals for this parameter estimation problem. The method acts on approximated signals given by truncated Shannon series, and uses Newton’s method to estimate the time delay and Doppler shift by calculating a point at which the resulting cross ambiguity function attains its maximum modulus. Numerical experiments demonstrated that the method generally outperformed other methods for estimation of both time delay and Doppler shift. We shall also discuss various possible extensions, including the notion of a generalized cross ambiguity function. Under this abstract generalization, error bounds for estimating the parameters are derived, and we will also reveal a connection between these bounds and a new type of uncertainty principle. This is joint work with Tim N. T. Goodman and Fuchun Shang.

Date : 20 June 2011 (Monday)
Time : 4:00 – 5:00 pm
Venue : Y6534 (MA Meeting Room), Yellow Zone
Level 5, Academic Building
City University of Hong Kong

** All are welcome **
For enquiry: 3442-8646