SPCOMIT Seminar Invitation

Title: Detection and localization under transformed probability measures.

Speaker: Nir Halay (BGU)

Abstract

This research is comprised of two parts, dealing with signal detection and source localization under transformed probability measures. In the first part, the Gaussian quasi likelihood ratio test (GQLRT) for binary hypothesis testing is generalized by applying a transform to the probability distribution of the data. The proposed generalization, called measure-transformed GQLRT (MT-GQLRT), selects a Gaussian probability model that best empirically fits a transformed probability measure of the data. The considered transform is structured by a non-negative function, called MT-function, that weights the data points. By proper choice of the MT-function we show that, unlike the GQLRT, the proposed test is resilient to outliers and involves higher-order statistical moments leading to significant mitigation of the model mismatch effect on the decision performance. A plug-in version of the non-Bayesian MT-GQLRT is developed for constant false alarm rate detection of a random signal in the presence of non-spherical noise. The proposed detector is derived by plugging an empirical measure-transformed noise covariance, obtained from noise-only secondary data, into the MT-GQLRT.
In the second part, we extend the recently developed measure-transformed multiple signal classification (MT-MUSIC) algorithm for robust source localization. The MT-MUSIC algorithm was confined to a specific zero-centered Gaussian MT-function parameterized by a width parameter. Selection of the width parameter was carried out via suboptimal data-driven procedure that controls the transform-domain Fisher information loss under nominal Gaussian distribution. The considered MT-MUSIC extension provides two important contributions. First, we show that the MT-MUSIC algorithm can be implemented with any strictly-positive spherically contoured MT-function. Second, we characterize the asymptotic performance of the MT-MUSIC algorithm, which paves the way for derivation of a data-driven procedure for optimal selection of the MT-function parameters.

The seminar will take place on **Tuesday, 24-10-2017, 13:10, in room 102 building 33**.