

Adilson CHINATTO

University of Campinas and Ecole Normale Supérieure de Cachan

Unicamp - ENS Cachan

ℓ_0 Optimization for DOA and Channel Sparse Estimation

Abstract: The problem of DOA and channel estimation has been an attractive research area in many applications involving electromagnetic, acoustic or seismic sensing. One important goal is to be able to locate closely spaced sources or equalizing a sparse channel in presence noise. The sparse estimation is a good candidate to reach this goal. It can be solved using ℓ_0 norm minimization but these problems are well known to be non convex and NP-Hard. A number of recent theoretical results have been proposed in the sense of relaxing the ℓ_0 norm by ℓ_1 norm. These techniques presents in some cases good results but can degrade or even fail when aspects as the restrict isometry property (RIP) of the mixture matrix is not respected. In this presentation will be discussed and compared algorithms from the class of greedy algorithms as Orthogonal Matching Pursuit (OMP), and from a recursively class as Iterative Hard Threshold (Proximal ℓ_0), Iterative Soft Threshold (Proximal ℓ_1) and a recently introduced Continuous Exact ℓ_0 penalty (CEL0). After introducing mathematical background we will apply and compare them in DOA and wireless channel estimation. The talk is directed towards electrical engineering or signal processing audience.

Bio: *Adilson Chinatto* received a degree in Electrical Engineering in 1997 and Masters in 2011, both from the University of Campinas (Unicamp), Brazil. He worked as hardware, software and firmware development engineer for optical transmission equipment in the companies AsGa and CPqD in Brazil. He is a co-founder of Espectro Ltd., a Brazilian design house for hardware and software, focused in signal processing. Nowadays he is coordinator of a High Performance GPS Receiver Project at Espectro Ltd. funded by the Brazilian National Counsel of Technological and Scientific Development (CNPq). He has experience in electrical engineering with emphasis on telecommunication systems, digital signal processing and smart antennas, working mainly with development and implementation of programmable logic devices (FPGA). He is currently finishing his Ph.D. at Unicamp, working with sparse and compressive sensing signal processing.

Email: chinatto@espectro-eng.com.br