ID de Contribution: **89** Type: **Contributed talk**

Chance-Constrained Optimization with Complex Variables

lundi 28 juillet 2025 17:30 (30 minutes)

Optimization problems involving complex variables, when solved, are typically transformed into real variables, often at the expense of convergence rate and interpretability. In this work, we introduce a novel formalism for a prominent problem in stochastic optimization involving complex random variables, which is termed the Complex Chance-Constrained Problem (CCCP). The study specifically examines the linear CCCP under complex normal distributions for two scenarios: one with individual probabilistic constraints and the other with joint probabilistic constraints. For the individual case, the core methodology reformulates the CCCP into a deterministic Second-Order Cone Programming (SOCP) problem, ensuring equivalence to the original CCCP. For the joint case, an approximation is achieved by deriving suitable upper and lower bounds, which also leads to a SOCP formulation. Finally, numerical experiments on a signal processing application—specifically, the Minimum Variance Beamforming problem with mismatch using MVDR—demonstrate that the proposed formalism outperforms existing approaches in the literature. A comparative analysis between the joint and individual CCCP cases is also included.

Author: Mme MADANI, Raneem (Laboratoire Des Signaux Et Systèmes, L2s - Centralesupélec)

Co-auteur: Prof. LISSER, Abdel (Laboratoire Des Signaux Et Systèmes, L2s - Centralesupélec)

Orateur: Mme MADANI, Raneem (Laboratoire Des Signaux Et Systèmes, L2s - Centralesupélec)

Classification de Session: Chance-constrained programming

Classification de thématique: Chance-constrained programming