

Title: The simplex way to obtain non-negative certificates over compact semialgebraic sets

Speaker: Juan Vera – University of Tilburg

Abstract: In this talk we show how to use certificates of non-negativity over the simplex to obtain certificates of non-negativity over compact semialgebraic sets. To illustrate our method, we construct new structured (e.g., sparse) certificates of non-negativity over unstructured compact sets. Also, we derive a general positivstellensatz which allows us to prove the existence of certificates of non-negativity (for positive polynomials) over any semialgebraic compact set, based on any class of non-negative polynomials such as SOS, DSOS, SDSOS, hyperbolic, SONC, and SAGE polynomials. Unlike typical proofs that make use of algebraic geometry tools, our proofs are based solely on convex analysis making them more amenable to the optimization community.