

Abstract

In this dissertation, we examine duality in convex conic optimization problems and its application in polynomial optimization. We derive new sufficient conditions for strong duality in convex conic programming and provide necessary and sufficient conditions for boundedness (or unboundedness) of nonempty sets of optimal solutions. We analyze the strong duality property in conic reformulations of standard convex programming problems and compare two versions of Slater conditions: the conic version for conic reformulations of standard convex programming problems and the generalized Slater condition for standard convex programming problems. Within the field of polynomial optimization, we concentrate on examining the properties of the cone of multivariate polynomials nonnegative on a given nonempty set and their respective dual cones. We analyze the strong duality property and its aspects in polynomial optimization problems.

Keywords: duality, convex conic optimization, polynomial optimization