

Abstract

We consider two notions for the representations of convex cones: G -representation and lifted- G -representation. The former represents a convex cone as a slice of another; the latter allows in addition, the usage of auxiliary variables in the representation. We first study the basic properties of these representations. We show that some basic properties of convex cones are invariant under one notion of representation but not the other. In particular, we prove that lifted- G -representation is closed under duality when the representing cone is self-dual. We also prove that strict complementarity of a convex optimization problem in conic form is preserved under G -representations. Then we move to study efficiency measures for representations. We evaluate the representations of homogeneous convex cones based on the “smoothness” of the transformations mapping the central path of the representation to the central path of the represented optimization problem.