

Title: Narrowing the Difficulty Gap for the Celis-Dennis-Tapia Problem  
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Abstract:

We study the Celis-Dennis-Tapia (CDT) problem: minimize a non-convex quadratic function over the intersection of two ellipsoids.

In contrast to the well-studied trust region problem where the feasible set is just one ellipsoid, the CDT problem is not yet fully understood. Our main objective in this paper is to narrow the difficulty gap that occurs when the Hessian of the Lagrangian is indefinite at all Karush-Kuhn-Tucker points. We prove new sufficient and necessary conditions both for local and global optimality, based on copositivity, giving a complete characterization in the degenerate case.