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Associative and Jordan algebras, and polynomial time interior-point algorithms for symmetric cones. (English) [Zbl 1073.90572](#)

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Summary: We present a general framework whereby analysis of interior-point algorithms for semidefinite programming can be extended verbatim to optimization problems over all classes of symmetric cones derivable from associative algebras. In particular, such analyses are extendible to the cone of positive semidefinite Hermitian matrices with complex and quaternion entries, and to the Lorentz cone. We prove the case of the Lorentz cone by using the embedding of its associated Jordan algebra in the Clifford algebra. As an example of such extensions we take Monterio's polynomial-time complexity analysis of the family of similarly scaled directions – introduced by *R. D. C. Monteiro and Y. Zhang* [*Math. Program.* 81, No. 3(A), 281–299 (1998; [Zbl 0919.90109](#))] – and generalize it to cone-LP over all representable symmetric cones.

MSC:

[90C51](#) Interior-point methods

[17A05](#) Power-associative rings

[17C55](#) Finite-dimensional structures of Jordan algebras

Cited in **1** Review
Cited in **68** Documents

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