The Electronic Journal of Linear Algebra.
A publication of the International Linear Algebra Society.
Volume 8, pp. 110-114, June 2001.
ISSN 1081-3810. http://math.technion.ac.il/iic/ela

ELA

A NOTE ON THE CONVEXITY OF THE REALIZABLE SET OF EIGENVALUES FOR NONNEGATIVE SYMMETRIC MATRICES*

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Abstract. Geometric properties of the set $\mathcal{R}_n$ of n–tuples of realizable spectra of nonnegative symmetric matrices, and the Soules set $\mathcal{S}_n$ introduced by McDonald and Neumann, are examined. It is established that $\mathcal{S}_5$ is properly contained in $\mathcal{R}_5$. Two interesting examples are presented which show that neither $\mathcal{R}_n$ nor $\mathcal{S}_n$ need be convex. It is proved that $\mathcal{R}_n$ and $\mathcal{S}_n$ are star convex and centered at $(1, 1, \ldots, 1)$.

Key words. Symmetric matrices, inverse eigenvalue problem, realizable set, Soules set.

AMS subject classifications. 15A18,15A29,15A57

*Received by the editors on 20 November 2000. Final manuscript accepted for publication on 12 June 2001. Handling editor: Daniel Hershkowitz.

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