A Comprehensive Note on Submatrix Constraint for Inverse Eigenvalue Problem of Symmetric Matrix

Manpreet Kaur* and Vineet Bhatt

Department of Mathematics, Chandigarh University, Mohali, Punjab, India-140413

*Corresponding Author

ABSTRACT

A matrix $P \in \mathbb{R}^{n\times n}$ is said to be (R,S) symmetric matrix if $RPS = P$, where R,S be nontrivial involutions. The conditions for solving the inverse eigenvalue problem with leading principal submatrix constraints using a (R, S) symmetric matrix are derived. Additionally, the existence, uniqueness, and expression of the (R, S) symmetric matrix solution to the inverse eigenvalue problem's best approximation problem. The problem's best approximation solution is computed using an algorithm that is also provided. A numerical example is provided to demonstrate the algorithm's viability.

Keywords: (R, S) symmetric matrix, inverse eigenvalue problem, leading principal submatrix, Moore-Penrose generalized inverse.

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