A new method for determining the radius of regularity of parametric interval matrices

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Abstract

The problem of determining the radius of regularity r^* of a parametric interval matrix is known to be NP-hard. In this paper a method for determining r^* is suggested, whose time complexity is not *a priori* exponential. The method is based on an equivalent transformation of the original problem to the problem of determining the real maximum magnitude (RMM) eigenvalue λ^* of an associated parametric generalised eigenvalue problem. The proposed method determines the regularity radius in polynomial if certain sign conditions are fulfilled. Otherwise, it produces upper bound $\overline{z}$ on r^*. Numerical examples of parametric interval matrices of large size illustrate the potential of the method.

Keywords

Parametric interval matrix, Regularity, Regularity radius.

References

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