
DIAGONALIZATION OF 4TH ORDER MATRICES REPRESENTING A QUATERNION

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ABSTRACT

This paper explores the diagonalization of 4th-order matrices representing quaternions, focusing on two distinct matrix representations: the left representation and the right representation. The study details a comprehensive diagonalization algorithm, including the steps necessary to determine eigenvalues and eigenvectors for quaternion matrices. By using specific examples, the paper demonstrates the application of this algorithm, providing a clearer understanding of the diagonalization process. The research highlights the importance of these matrix representations in simplifying the analysis of quaternion structures, emphasizing their utility in streamlining complex quaternion computations and improving their interpretability.

Keywords Quaternions · Diagonalization 4th-order matrices · Eigenvalues-Eigenvectors

References

- [1] Y.Tian, Matrix representations of octonions and their applications, Adv.Appl. Clifford Algebras, 10(1)(2000), 61-90.
- [2] C. Flaut, V. Shpakivskyi, Real matrix representations for the complex quaternions, Adv. Appl. Clifford Algebras, 23(3)(2013), 657-671.
- [3] A.Lucia, P. A. Corduneanu, M. Lupan, Lectii de algebra liniara, Iasi, 2005.
- [4] M. Xiao, R. Tan, H. Ye, L. Gong, Z. Zhu, Double-Color-Image Compression-Encryption Algorithm Basedon Quaternion Multiple Parameter DFrAT and Feature Fusionwith Preferable Restoration Quality, Entropy 2022, 24, 941.
- [5] Y.Tian, Matrix Theory over the Complex Quaternion Algebra, Mathematics, Rings and Algebras, published 1 April 2000.

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