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The diagonalization map as submersion, the cubic equation as immersion and Euclidean polynomials. (English) Zbl 07488621


Summary: In the first part of this note, a restriction of the diagonalization map from $\text{Sym}(2)$ to $\mathbb{R}^2$ is studied as Riemannian submersion using the Hermitian parameters. A strong relationship with the Hopf bundle is pointed out and the symmetric matrices with determinant $-\frac{1}{2}$ are obtained as an extremal case. The Hopf invariant is computed for some classes of examples. In the second part, we prove that the solution map of the depressed cubic equation with strictly negative discriminant is an immersion. In the third part, we define a class of polynomials, called by us Euclidean due to the isometrical character of the solution map.

MSC:
15A15 Determinants, permanents, traces, other special matrix functions
15A18 Eigenvalues, singular values, and eigenvectors
15A20 Diagonalization, Jordan forms
15B57 Hermitian, skew-Hermitian, and related matrices
53C20 Global Riemannian geometry, including pinching

Keywords: symmetric matrix; Hermitian parameters; eigenvalue; Riemannian submersion; depressed cubic equation; Euclidean polynomial

Full Text: DOI

References:

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