

Abstract

3-by-3 Pure Imaginary Quaternionic Solutions of the Hurwitz Matrix

Equations

by

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In this thesis, it is proved that the maximum number of 3×3 pure imaginary quaternionic solutions, T_1, T_2, \dots, T_p , of the Hurwitz matrix equations given by

$$T_i T_j^* + T_j T_i^* = \begin{cases} 2I, & \text{if } i = j, \\ 0, & \text{otherwise.} \end{cases}$$

is 3.

This thesis is divided into three chapters. There are some notations, definitions and background in Chapter 1.

In Chapter 2, there are some lemmas and a theorem. In the theorem, it is shown that an $n \times n$ pure imaginary quaternionic unitary matrix is orthogonally congruent to a diagonal matrix.

Chapter 3 consists of the main result. It is proved by contradiction that the maximum number of 3×3 pure imaginary quaternionic solutions of the Hurwitz matrix equations is 3.