Finding the Formula for How Many Topological Equivalence Classes Are the Graphs Representing All Traceless nxn Hermitian Operators

Elif Tekin Tarım
Yildiz Technical University, Department of Mathematics
tekintar@yildiz.edu.tr

Abstract

The numbers of positive, zero, and negative eigenvalues (n_+, n_0 and n_-, respectively) of any Hermitian operator and the graphs representing it are pictorially found using the linear covariance principle and the three pictorial rules. The rules also allow one to obtain all the graphs that belong to the same topological-algebraic equivalence class. Each class is characterized by the three integers n_+, n_0 and n_- which are topological invariants. These numbers correspond to energy levels in quantum chemistry.

In this article, the number n given is the dimension of the linear vector space V_n on which the nxn Hermit operators act (also n=number of vertices of graphs represented Hermitian operators). It is aimed to find a formula that gives the number of topological classes of nxn zero-trace Hermitian operators and of n-point "simple graphs" representing them in this study.

Keywords: Hermitian operator, simple graph, principle of linear covariance, topological equivalence class

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