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The Second Smallest Eigenvalue of Complete Tripartite Hypergraph

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Abstract : In the terminology of the hypergraph, there is a relation with the terminology graph. In the theory of graph, the edges connected two vertices. In otherwise, in hypergraph, the edges can connect more than two vertices. There is representation matrix of a graph such as adjacency matrix, Laplacian matrix, and incidence matrix. The adjacency matrix is symmetry matrix so that all eigenvalues is real. This matrix is a nonnegative matrix. The all diagonal entry from adjacency matrix is zero so that the trace is zero. Another representation matrix of the graph is the Laplacian matrix. Laplacian matrix is symmetry matrix and semidefinite positive so that all eigenvalues are real and non-negative. According to the spectral study in the graph, some that result is generalized to hypergraph. A hypergraph can be represented by a matrix such as adjacency, incidence, and Laplacian matrix. Throughout for this term, we use Laplacian matrix to represent a complete tripartite hypergraph. The aim from this research is to determine second smallest eigenvalues from this matrix and find a relation this eigenvalue with the connectivity of that hypergraph.

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