

Dihedral group as generalized conjugacy class graph and its relevant matrices

ABSTRACT

In this paper, the generalized conjugacy class graph for dihedral group of order $2n$ is constructed to show the relation between the orbits and their cardinalities. The orbits of the set denoted by Ω must be computed first by using conjugation action. The elements in each orbit are all pairs of commuting elements in the form of (a, b) where a and b are elements of the dihedral group and the lowest common multiple of the order of the elements has to be two. Also here, some relevant matrices named as adjacency, incident and Laplacian matrices that can represent the graph are also constructed. Eigenvalues from those matrices are computed to give information on graph energies either energy, denoted by $\varepsilon(\Gamma G)$ or Laplacian energy, denoted by $LE(\Gamma G)$. Interestingly, we have found that the values for both $\varepsilon(\Gamma G)$ and $LE(\Gamma G)$ are equal.

Keyword: Dihedral group; Laplacian matrix; Incidence matrix; Adjacency matrix; Generalized conjugacy class graph; Graph energy