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INSPEM'S MONTHLY SEMINAR

24 JULY 2024 | 2.00PM-5.00PM

HYBRID: AL-FARABI SEMINAR ROOM, INSPEM, UPM

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MEET OUR SPEAKERS

ON SYMMETRIC DERIVATIONS IN RINGS

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ABSTRACT

Let R be any ring. An additive mapping d: R → R is said to be a derivation on R if d(xy) = d(x)y + xd(y) holds for all x, y ∈ R. A bi-additive map D: R × R → R is said to be a bi-derivation if D(xx′, y) = D(x, y)x′ + xD(x′, y) D(x, yy′) = D(x, y)y′ + yD(x, y′) holds for any x, x′, y, y′ ∈ R. The foregoing conditions are identical if D is also a symmetric map, that is, if D(x, y) = D(y, x) for every x, y ∈ R. In this case, D is referred as a symmetric bi-derivation on R. In this talk, we will discuss the recent progress made on the topic and related areas. Moreover, some examples and counter examples will be discussed for questions raised naturally. We conclude the talk with some open problems.

ABSTRACT

In this talk, some properties of algebraic graphs associated to some groups and rings, namely the energies of the graphs and their topological indices, will be presented. The energy of a simple graph is defined as the summation of the absolute value of the eigenvalues of the adjacency matrix of the graph. It was motivated by the Hckel Molecular Orbital theory. The theory was used by chemists to estimate the energy associated with -electron orbitals of molecules which is called conjugated hydrocarbons. Meanwhile, a topological index is a function that assigns a numeric value to a (molecular) graph that predicts its various physical and structural properties such as volume, density, pressure, weight, boiling point, freezing point, vaporisation point, heat of formation, and heat of evaporation. In this presentation, the energy and Laplacian energy of the non-commuting and conjugacy class graphs associated to some finite groups are presented. The Seidel energy of the Cayley graph of some finite groups are also determined. In addition, this presentation focuses on the degree-based and distance-based topological indices. The degree-based topological indices include the first Zagreb index, the second Zagreb index, the general zeroth-order Randi index, and the Sombor index. The distance-based topological indices include the Wiener index, the Szeged index, and the Harary index. The graphs considered are the non-commuting graph and the coprime graph associated to the dihedral groups, the generalized quaternion groups, the quasidihedral groups, alternating groups, and symmetric groups. Another graph discussed in finding its topological indices is the zero divisor graph associated to some commutative rings.

ON SOME PROPERTIES OF ALGEBRAIC GRAPHS ASSOCIATED TO GROUPS AND RINGS

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