Degree of h-polynomials of edge ideals

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Abstract

This talk will focus on the degree of h-polynomials of edge ideals for finite simple graphs, focusing on combinatorial formulas for various fundamental graph classes, including paths, cycles, and bipartite graphs. To the best of our knowledge, this work represents the first effort to interpret this algebraic invariant combinatorially. Moreover, we provide a characterization of all connected graphs where the sum of the Castelnuovo-Mumford regularity and the degree of the h-polynomial of an edge ideal attains its maximum, which is the number of vertices in the graph.

Keywords: Edge ideal, simple graph, Castelnuovo-Mumford regularity.