Counting the number of different convertible Hessenberg type $(0,1)-$matrices arising from graph enumerations

Rogério Serôdio

Universidade da Beira Interior

rserodio@ubi.pt

(*joint work with* Ilda Inácio, Henrique F. da Cruz)

Abstract

From a simple graph G with n vertices, labeled with distinct elements $\{1, 2, \ldots, n\}$, we can construct G-lower Hessenberg $(0, 1)$-matrices. These matrices are said to be convertible if we can uniformly affix $\pm$ signs to some entries such that the determinant is convertible into the permanent. It has been proved that the graphs that admit an enumeration of its vertices that gives rise to a convertible subspace are caterpillars. In this talk we present an algorithm for counting the number of different enumerations of a caterpillar. For a fixed number of vertices, we determine all possible configurations for the caterpillars and for each one we count the number of different enumerations. With these numbers we present a new triangle of numbers, which we called the Gibson-Hessenberg Triangle, and give the generating function for these numbers.