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LINEAR ALGEBRA METHODS FOR COUNTING THE NUMBER OF PERFECT MATCHINGS IN GRAPHS

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Abstract

A **matching** M in a graph G is a collection of edges of G such that no two edges of M share a vertex. If every vertex of G is incident to an edge of M , the matching M is called **perfect**. Perfect matchings have played an important role in the chemical graph theory and statistical mechanics.

In this talk, we introduce some linear Algebra methods for counting the number of perfect matchings or finding upper bounds on perfect matchings in graphs. We describe pfaffian orientation and pfaffian method to reach determinant formula for counting perfect matchings in graphs and we apply this Formula and Hadamard's determinant inequality to give upper bounds for the number of perfect matchings in Pfaffian graphs. Also, we introduce transfer matrix method and then apply this method to present some results in counting the number of perfect matchings in graphs.

A **fullerene graph** is a cubic, planar, 3-connected graph with only pentagonal and hexagonal faces. These graphs is one of the most important molecular graphs in mathematical chemistry. We apply our results to fullerene graphs and present some theorems and exact number of perfect matchings in these graphs.

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Time: 11:00

Place: IMBM Seminar Room, Boğaziçi University South Campus