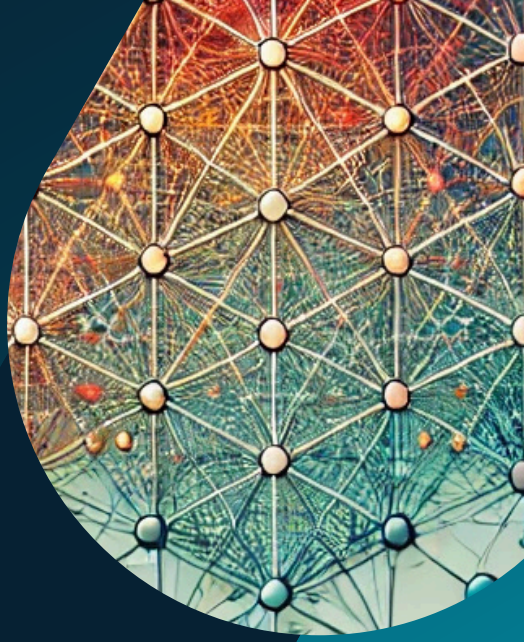
EGE UNIVERSITY, FACULTY OF SCIENCE
DEPARTMENT OF MATHEMATICS



International Symposium on Structural Graph Theory

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Meeting ID: 354 918 447 821
Passcode: TE7uZ9Ao

13 DECEMBER 2024
14:00 (GMT+3)

EGE UNIVERSITY, FACULTY OF SCIENCE
DEPARTMENT OF MATHEMATICS

INTERNATIONAL SYMPOSIUM ON STRUCTURAL GRAPH THEORY

13 December 2024

PROGRAMME

CHAIR: Assoc. Prof. Dr. Gülnaz BORUZANLI EKİNCİ
Ege University, Department of Mathematics

TIME	SPEAKER	TITLE
14:00-14:30	**Csilla BUJTÁS** University of Ljubljana, Slovenia Institute of Mathematics, Physics, and Mechanics, Ljubljana, Slovenia	*Triangles, edges, covers and independence*
14:35-15:05	**Ademir HUJDUROVIĆ** University of Primorska, Koper, Slovenia	*Canonical double covers and their symmetries*
15:10-15:40	**Didem GÖZÜPEK** Gebze Technical University, Kocaeli, Türkiye	*Triangle-free equimatchable graphs*

The meeting will be held online via Microsoft Teams.
Meeting ID: 354 918 447 821
Passcode: TE7uZ9Ao

Triangles, edges, covers, and independence

Csilla Bujtás

Faculty of Mathematics and Physics, University of Ljubljana, Slovenia

Institute of Mathematics, Physics, and Mechanics, Ljubljana, Slovenia

(Joint work with
Akbar Davoodi, Laihao Ding, Ervin Győri, Zsolt Tuza, and Donglei Yang)

We start the talk with a famous conjecture of Tuza that relates two graph invariants: the minimum number of edges, $\tau_\triangle(G)$, that cover all triangles in a graph G, and the maximum number of edge-disjoint triangles, $\nu_\triangle(G)$, in a graph G. The 40-year-old conjecture asserts that $\tau_\triangle(G) \leq 2\nu_\triangle(G)$ holds for every graph G. Despite the numerous partial results, the conjecture is still wide open.

In a recent work motivated by a question of Erdős, Gallai, and Tuza, we studied a related problem. Let $\rho_\triangle(G)$ denote the minimum number of edges and triangles that cover all edges of G, and let $\alpha_1(G)$ be the maximum size of an edge set that contains at most one edge from each triangle. We study the relationship between $\rho_\triangle(G)$ and $\alpha_1(G)$ and establish a sharp upper bound on $\rho_\triangle(G)$. We also prove Nordhaus-Gaddum-type inequalities for the two invariants.

Canonical double covers and their symmetries

Ademir Hujdurović

University of Primorska, Koper, Slovenia

Canonical double cover BX of a graph X is the direct product of X with K_2 (the complete graph on two vertices). Automorphisms of the base graph X naturally lift to automorphisms of BX. In addition, there is an obvious involutory automorphism of BX swapping the bipartition sets. Expected automorphisms of BX are those that can be obtained by combining the above two types, and generate a group isomorphic to $Aut(X) \times S_2$. If BX has only the expected automorphisms, then X is called stable, and it is called unstable otherwise. Characterization of stable graphs is an open problem, even when restricted to special graph classes like circulant graphs.

In this talk, I will present several constructions of unstable graphs and characterizations within certain graph families, with special emphasis on circulant graphs.

Triangle-free equimatchable graphs

Didem Gözüpek

Department of Computer Engineering,
Gebze Technical University, Kocaeli, Türkiye

A graph is called equimatchable if all of its maximal matchings have the same size. Frendrup et al. provided a characterization of equimatchable graphs with girth at least 5. In this work, we extend this result by providing a complete structural characterization of equimatchable graphs with girth at least 4, that is, equimatchable graphs with no triangle, by identifying the equimatchable triangle-free graph families. Our characterization also extends the result given by Akbari et al., which proves that the only connected triangle free equimatchable r-regular graphs are C_5, C_7, and $K_{r,r}$, where r is a positive integer. Given a nonbipartite graph, our characterization implies a linear time recognition algorithm for triangle-free equimatchable graphs.

This work has been completed in collaboration with Yasemin Büyükçolak and Sibel Özkan from the Department of Mathematics, Gebze Technical University and has been published in Journal of Graph Theory in 2022.