Speakers: Kristína Kováčiková
kristina.kovacikova@fmph.uniba.sk
Comenius University in Bratislava
Co-author: Martin Mačaj
Title: The numbers of induced subgraphs in strongly regular graphs

Let us fix a graph Γ. By P_G we denote the number of occurrences of graph G as an induced subgraph in Γ. Clearly, the values P_{K_1}, P_{K_2} and $P_{\overline{K}_2}$ represent the numbers of vertices, edges and non-edges in Γ, respectively.

A k-regular graph Γ of order n, where the number of common neighbours of any two vertices in Γ depends only on whether they are adjacent or not, is called a strongly regular graph ($SRG(n, k, \lambda, \mu)$). In this case it is known that the value P_G of any graph G on at most three vertices is determined uniquely by parameters of SRG. Unfortunately, with G spanning more than 3 vertices, this nice property is no longer satisfied. An example of such behavior are two non-isomorphic $SRGs$ with parameter set $(16, 6, 2, 2)$ and different values of P_{K_4}.

We study how the values of P_G for all the graphs on t vertices interact. For triangle-free SRG we show that P_G is determined by n, k, λ and μ for any G on at most five vertices. When G is a graph on six vertices, P_G depends also on the value $P_{K_{3,3}}$.

For putative Moore graph with parameters $(3250, 57, 0, 1)$, P_G is determined uniquely for any graph G on up to 9 vertices. For all graphs on 10 vertices the values P_G are dependent only on the number of occurrences of Petersen graph in this SRG.