On H-irregular graphs

Andrea Feňovčíková[1]
Joint work with Faraha Ashraf[2], Martin Bača[1], Zuzana Kimáková[1] and Marcela Lascsáková[1]

[1]) Department of Applied Mathematics and Informatics, Technical University, Košice, Slovakia
andrea.fenovcikova@tuke.sk
[2]) Abdus Salam School of Mathematical Sciences, GC University, Lahore, Pakistan

An *H-covering* of G is a family of subgraphs $H_1, H_2, \ldots, H_t$, all isomorphic to a given graph H, such that each edge of $E(G)$ belongs to at least one of the subgraphs H_i, $i = 1, 2, \ldots, t$.

Let G be a graph admitting H-covering and let φ be a total k-labeling of G that assigns to vertices and edges of G the numbers from the set $\{1, 2, \ldots, k\}$. For the subgraph $H \subseteq G$ under the total k-labeling φ, we define the associated H-weight as

$$wt_\varphi(H) = \sum_{v \in V(H)} \varphi(v) + \sum_{e \in E(H)} \varphi(e).$$

A total k-labeling φ is called to be an *H-irregular total k-labeling* of the graph G if for every two different subgraphs H' and H'' isomorphic to H there is $wt_\varphi(H') \neq wt_\varphi(H'')$. The *total H-irregularity strength* of a graph G, denoted by $\mathrm{ths}(G, H)$, is the smallest integer k such that G has an H-irregular total k-labeling.

In the talk we will give some estimations on this graph characteristic and for some families of graphs we will present the precise values of this parameter.