

Edge-Injective and Edge-Surjective Vertex Labellings

Dieter Rautenbach
TU Ilmenau
Germany

Joint work with

Stephan Brandt, Jozef Miskuf and Friedrich Regen

Abstract

For a graph $G = (V, E)$ we consider vertex- k -labellings $f : V \rightarrow \{1, 2, \dots, k\}$ for which the induced edge weighting $w : E \rightarrow \{2, 3, \dots, 2k\}$ with $w(uv) = f(u) + f(v)$ is injective or surjective or both.

We study the relation between these labellings and the number theoretic notions of an additive basis and a Sidon set, present a new construction for a so-called restricted additive basis and derive the corresponding consequences for the labellings.

We prove that a tree of order n and maximum degree Δ has a vertex- k -labelling f for which w is bijective if and only if $\Delta \leq k = n/2$. Using this result we prove a recent conjecture of Ivančo and Jendrol' concerning edge-irregular total labellings for graphs that are sparse enough.