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Roman Nedela*, Institute of Mathematics, Slovak Academy of Science, Dumbierska 1, 97549, Banska Bystrica, Slovak Rep. *Graph coverings and harmonic functions on graphs*. Preliminary report.

The theory of graph covers is central in topological graph theory. Its development is closely related to the solution of the Heawood map colour problem Ringel and Youngs and to the investigation of highly symmetrical graphs, where it served as a universal construction method, see works of Biggs and others. Later, it found applications in other areas of graph theory including the degree-diameter problem, flows on graphs, spectral theory and others.

In the present talk we first resume the state of art of the theory and applications. Then we shall discuss a generalization of graph coverings to harmonic functions defined on graphs – a new recently opened area of research connecting graph theory to classical fields of continuous mathematics dealing with the theory of manifolds, Riemann surfaces and elliptic curves. (Received September 17, 2013)