ABSTRACT FOR 2026 CUMBERLAND CONFERENCE

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Title. Extremal problems for monotone paths

Abstract. A path in an edge-ordered graph is *monotone* if its edge labels are increasing from one endpoint to the other. The problem of finding the *altitude* of a graph G, the maximum length of a monotone path guaranteed in every edge-ordering of G, was introduced by Chvátal and Komlós in 1971. In 2020, Gerbner, Methuku, Nagy, Pálvölgyi, Tardos, and Vizer introduced the systematic study of the edge-ordered Turán number. We study this problem for monotone paths, proving that the maximum size of an edge-ordered graph of order n which does not contain a monotone path of length 4 is $5n/2$. We also prove results on the altitudes of complete bipartite graphs and hypercubes. This talk is based on joint work with Neal Bushaw, Van Magnan, Puck Rombach, and Per Wagenius.

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