Increasing Paths in Countable Hypergraphs

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In this paper we study variations of an old result by Müller, Reiterman, and the last author stating that a graph with countably many vertices has a subgraph with all degrees infinite if and only if in any labeling of the vertices (or edges) of this graph by $\mathbb{N}$ we can always find an infinite increasing path. We study corresponding questions for hypergraphs and directed graphs. In this talk we show that the condition that a hypergraph contains a subhypergraph with infinite degrees is equivalent to the condition that any vertex labeling by $\mathbb{N}$ contains an infinite increasing binary tree.