NONREPETITIVE LIST COLORINGS OF TREES

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A *nonrepetitive coloring* of a path is a coloring of its vertices such that the sequence of colors along the path does not contain two identical, consecutive blocks. The remarkable construction of Thue asserts that 3 colors are enough to color nonrepetitively paths of any size. A nonrepetitive coloring of a graph is a coloring of its vertices such that all simple paths are nonrepetitively colored. Alon et al.(2002) proved that every graph G with maximum degree at most Δ is $O(\Delta^2)$-nonrepetitively colorable. Assume that each vertex v of a graph G has assigned a set (list) of colors L_v. A coloring is *chosen from* $\{L_v\}_{v \in V(G)}$ if the color of each v belongs to L_v. We say that G is *k-nonrepetitively choosable* if for any such assignment of lists of size k there is a nonrepetitive coloring of G chosen from these lists. Recently, we gave a very simple counting argument that all paths are 4-nonrepetitively choosable. This cannot be extended for all trees as Ossona de Mendez and Zhu (2011+) proved that for any k there is a tree T which is not k-nonrepetitively choosable. On the other hand, the Thue's construction can be easily adopted to show that 4 colors suffice to color nonrepetitively any tree. This indicates the huge difference between the nonrepetitve coloring and the list-setting. In this talk, I will give some insights into the argument that for all $\varepsilon > 0$ there is a constant c such that every tree T with maximum degree at most Δ is $c \cdot \Delta^{1+\varepsilon}$-nonrepetitively choosable. We will also discuss the possible directions of the future research. Our techinques are inspired by a new algorithmic proof of the Lovász Local Lemma due to Moser and Tardos.

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