AN ALMOST EQUITABLE COLORING OF A WEIGHTED FOREST

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The talk addressees the problem of equitable coloring of weighted forests. In general, an instance of Equitable Coloring consists of:

- a simple graph (V, E),
- a weight function $w : V \to N$,
- a number of colors m,
- and a question if there exists a coloring of the vertices f, such that for any color c, $\sum_{v \in f^{-1}(c)} w(v) = \sum_{v \in V} w(v)/m$.

One can consider 3 particular cases of the input data.

- When $w \equiv 1$ and the graph is a forest.
- When a graph has no edges and w is an arbitrary function.
- The case when w is an arbitrary function and the graph is a forest.

In the first case the problem is polynomial time. In the second case the problem is NP-complete. However, there exists a polynomial time algorithm (a PTAS, imprecisely speaking) computing an answer that either: there is no such coloring; or that there is coloring f where for any color c, $\sum_{v \in f^{-1}(c)} w(v) \leq (1+\epsilon) \sum_{v \in V} w(v)/m$, where ϵ is any fixed number greater than 0.

The third case is addressed during the talk. Insights are provided, in particular a classification of the vertices, which can be used to provide a PTAS for Equitable Coloring with respect to weighted forests.

References

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