

Prof. Roger Wattenhofer

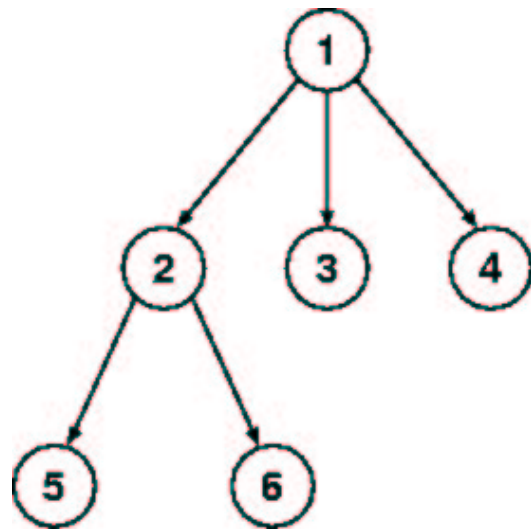
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Semester/Diploma/Master's Thesis "Dynamic Graph Labelings"

We are used to nodes bringing their own labels (such as a MAC address, or some device ID) into an ad hoc network. Now what if we changed that idea and *assign* labels to a node joining a network (a similar paradigm as with P2P networks) so that the new label reflects, say, the topology of the network? In other words, we want to assign the labels of the nodes in such a way that we can locally compute the distance between two nodes given their labels. Obviously, that computation should be fast (i.e. at least polynomially in the label size), but also, the size of the computed labels themselves should be small, preferably sub-linear in the size of the network. On top of these labels we can then implement an efficient *routing scheme*. To route to a destination, simply choose the neighbor which is closest to it, based on the neighbors' and the destination's labels.



This idea has been quite old (at least fifteen years), however, not much progress has been made for the case of *dynamic* graphs. Your task will be to bring yourself up-to-date with the literature and then to suggest an algorithm for a distance labeling in dynamic graphs. Of course, there are different tradeoffs at your disposal: bigger labels but better dynamics, or smaller but not quite exact labels, etc.

Skills

- Knowledge of the basics of theoretical computer science (e.g. TI Kernfach)
- Flair for algorithms

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