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SEQUENTIAL METRIC DIMENSION (IN TREES)

Julien Bensmail
Université Côte d'Azur

In the *Localization Game*, introduced by Seager in 2013, an invisible and immobile target is hidden at some vertex of a graph G. At every step, one vertex v of G can be probed which results in the knowledge of the distance between v and the secret location of the target. The objective of the game is to minimize the number of steps needed to locate the target whatever be its location. In a joint work with D. Mazauric, F. Mc Inerney, N. Nisse and S. Pérennes, we addressed the generalization of the Localization Game where $k \geqslant 1$ vertices can be probed at every step, which also stands as a generalization of the notion of *metric dimension* of graphs. Precisely, given a graph G and two integers $k, \ell \geqslant 1$, the Localization problem asks whether there exists a strategy to locate a target hidden in a given graph G in at most ℓ steps and probing at most k vertices per step. The Localization problem is, in general, hard to comprehend. However, we settled it in the context of trees; namely:

- On the negative side, the Localization problem is, in general, NP-complete when restricted to trees.
- On the positive side, there is a $(+1)$-approximation for the problem in trees, *i.e.*, a polynomial strategy to locate the target in at most one more step than the optimal number of steps.

In other words, in trees, the hardness of the Localization problem only arises from the first probing step, which is NP-hard to decide. A consequence is that we can optimally determine the location of the target, assuming the first probing step is provided e.g. by an oracle. The talk will be dedicated to discussing these aspects.