THE WEIZMANN INSTITUTE OF SCIENCE
FACULTY OF MATHEMATICS AND COMPUTER SCIENCE
Faculty Seminar

Room 1 ,Ziskind Building
on Tuesday, Dec 28, 2021at 11:15

The lecture will be also in Zoom at: https://weizmann.zoom.us/j/97604026721?pwd=SVZnd3NsQXBqNHFhOU04bTFNQVRhQT09

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Approximating the Arboricity in Sublinear Time

Abstract:

We consider the problem of approximating the arboricity of a graph $G=(V,E)$, which we denote by $arb(G)$, in sublinear time, where the arboricity of a graph is the minimal number of forests required to cover its edges. An algorithm for this problem may perform degree and neighbor queries, and is allowed a small error probability. We design an algorithm that outputs an estimate $\hat{\alpha}$, such that with probability $1-1/poly(n)$, $arb(G)/c log2 n \leq \hat{\alpha} \leq \arb(G)$, where $n=|V|$ and c is a constant. The expected query complexity and running time of the algorithm are $O(n/arb(G))\cdot \poly(\log n)$, and this upper bound also holds with high probability. This bound is optimal for such an approximation up to a $poly(log n)$ factor. This result has important implications as many sublinear-time algorithms are parameterized by the arboricity, and rely on getting its value as input.

Based on joint work with Saleet Mossel and Dana Ron.