Approximation and parameterized algorithms for geometric independent set with shrinking

Pilipczuk, Michal

Van Leeuwen, Erik Jan

Wiese, Andreas

 Consider the Maximum Weight Independent Set problem for rectangles: given a family of weighted axis-parallel rectangles in the plane, find a maximum-weight subset of non-overlapping rectangles. The problem is notoriously hard both in the approximation and in the parameterized setting. The best known polynomial-time approximation algorithms achieve super-constant approximation ratios [5, 7], even though there is a (1+0)-approximation running in quasi-polynomial time [2, 8]. When parameterized by the target size of the solution, the problem is W[1]-hard even in the unweighted setting [12]. To achieve tractability, we study the following shrinking model: one is allowed to shrink each input rectangle by a multiplicative factor 1 - ? for some fixed ? > 0, but the performance is still compared against the optimal solution for the original, non-shrunk instance. We prove that in this reg