Efficient approximation of min set cover by “low-complexity” exponential algorithms

Abstract

We study approximation of min set cover combining ideas and results from polynomial approximation and from exact computation (with non-trivial worst case complexity upper bounds) for NP-hard problems. We design approximation algorithms for min set cover achieving ratios that cannot be achieved in polynomial time (unless problems in NP could be solved by slightly super-polynomial algorithms) with worst-case complexity much lower (though super-polynomial) than those of an exact computation.