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**Inapproximability of hypergraph vertex cover and applications to scheduling problems.**

(English) [Zbl 1287.90018](#)

Abramsky, Samson (ed.) et al., Automata, languages and programming. 37th international colloquium, ICALP 2010, Bordeaux, France, July 6–10, 2010. Proceedings, Part I. Berlin: Springer (ISBN 978-3-642-14164-5/pbk). Lecture Notes in Computer Science 6198, 250-261 (2010).

Summary: Assuming the Unique Games Conjecture (UGC), we show optimal inapproximability results for two classic scheduling problems. We obtain a hardness of  $2 - \epsilon$  for the problem of minimizing the total weighted completion time in concurrent open shops. We also obtain a hardness of  $2 - \epsilon$  for minimizing the makespan in the assembly line problem.

These results follow from a new inapproximability result for the Vertex Cover problem on  $k$ -uniform hypergraphs that is stronger and simpler than previous results. We show that assuming the UGC, for every  $k \geq 2$ , the problem is inapproximable within  $k - \epsilon$  even when the hypergraph is almost  $k$ -partite.

For the entire collection see [\[Zbl 1194.68005\]](#).

**MSC:**

- [90B35](#) Deterministic scheduling theory in operations research
- [05C65](#) Hypergraphs
- [05C70](#) Edge subsets with special properties (factorization, matching, partitioning, covering and packing, etc.)
- [68Q17](#) Computational difficulty of problems (lower bounds, completeness, difficulty of approximation, etc.)

Cited in **19** Documents

**Full Text:** [DOI](#)