Parameterized graph cleaning problems. (English) | Zbl 1209.05248

Summary: We investigate the Induced Subgraph Isomorphism problem with non-standard parameterization, where the parameter is the difference $|V(G)| - |V(H)|$ with $H$ and $G$ being the smaller and the larger input graph, respectively. Intuitively, we can interpret this problem as “cleaning” the graph $G$, regarded as a pattern containing extra vertices indicating errors, in order to obtain the graph $H$ representing the original pattern. We show fixed-parameter tractability of the cases where both $H$ and $G$ are planar and $H$ is 3-connected, or $H$ is a tree and $G$ is arbitrary. We also prove that the problem when $H$ and $G$ are both 3-connected planar graphs is NP-complete without parameterization.

MSC:
05C85 Graph algorithms (graph-theoretic aspects)
05C60 Isomorphism problems in graph theory (reconstruction conjecture, etc.) and homomorphisms (subgraph embedding, etc.)
68Q17 Computational difficulty of problems (lower bounds, completeness, difficulty of approximation, etc.)
68Q25 Analysis of algorithms and problem complexity

Keywords:
graph algorithm; fixed-parameter tractability; induced subgraph isomorphism

Full Text: DOI Link

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