Fast recognition algorithms for classes of partial cubes. (English) Zbl 1022.05050

Summary: Isometric subgraphs of hypercubes, or partial cubes as they are also called, are a rich class of graphs that include median graphs, subdivision graphs of complete graphs, and classes of graphs arising in mathematical chemistry and biology. In general, one can recognize whether a graph on \( n \) vertices and \( m \) edges is a partial cube in \( O(mn) \) steps, faster recognition algorithms are only known for median graphs. This paper exhibits classes of partial cubes that are not median graphs but can be recognized in \( O(m \log n) \) steps. On the way relevant decomposition theorems for partial cubes are derived, one of them correcting an error in a previous paper [W. Imrich and S. Klavžar, Eur. J. Comb. 19, 677-685 (1998; Zbl 0918.05085)].

MSC:
05C60 Isomorphism problems in graph theory (reconstruction conjecture, etc.) and homomorphisms (subgraph embedding, etc.)
05C85 Graph algorithms (graph-theoretic aspects)
68R10 Graph theory (including graph drawing) in computer science

Keywords:
isometric subgraph; hypercube; algorithm; complexity

Full Text: DOI

References:

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