

INTERNALLY 4-CONNECTED GRAPHS WITH NO $\{\text{CUBE}, V_8\}$ -MINOR

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Abstract

A simple graph is a minor of another if the first is obtained from the second by deleting vertices, deleting edges, contracting edges, and deleting loops and parallel edges that are created when we contract edges. A cube is an internally 4-connected planar graph with eight vertices and twelve edges corresponding to the skeleton of the cube in the platonic solid, and the Wagner graph V_8 is an internally 4-connected nonplanar graph obtained from a cube by introducing a twist. A complete characterization of all internally 4-connected graphs with no V_8 minor is given in J. Maharry and N. Robertson, *The structure of graphs not topologically containing the Wagner graph*, J. Combin. Theory Ser. B 121 (2016) 398–420; on the other hand, only a characterization of 3-connected graphs with no cube minor is given in J. Maharry, *A characterization of graphs with no cube minor*, J. Combin. Theory Ser. B 80 (2008) 179–201. In this paper we determine all internally 4-connected graphs that contain neither cube nor V_8 as minors. This result provides a step closer to a complete characterization of all internally 4-connected graphs with no cube minor.

Keywords: internally 4-connected, minor, cube graph, V_8 graph.

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