Existence and Construction of Maximal Rectangular Duals

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Abstract : Given a graph G = (V, E), a rectangular dual of G represents the vertices of G by a set of interior-disjoint rectangles such that two rectangles touch if and only if there is an edge between the two corresponding vertices in G. Rectangular duals do not exist for every graph, so we can define maximal rectangular duals. A maximal rectangular dual is a rectangular dual of a graph G such that there exists no graph G′ with a rectangular dual where G is a subgraph of G′. In this paper, we enumerate all maximal rectangular duals (or, to be precise, the corresponding planar graphs) up to six nodes and presents a necessary condition for the existence of a rectangular dual. This work allegedly has applications in integrated circuit design and architectural floor plans.