

COMPLETELY DISTINGUISHABLE PROJECTIONS OF SPATIAL GRAPHS

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A generic plane immersion of a finite graph is said to be *completely distinguishable* if any two spatial embeddings of the graph obtained from the immersion by giving over/under information to each of double points are not ambient isotopic. A completely distinguishable projection is said to be *trivial* if it has no double points.

We show that a generic plane immersion of a *trivializable* planar graph is completely distinguishable if and only if it has no double points, and if a generic plane immersion of a non-trivializable planar graph is a non-trivial completely distinguishable projection then it is a *knotted projection*. Therefore only non-trivializable or non-planar graphs have a non-trivial completely distinguishable projection. We give examples of non-trivial completely distinguishable projections of several non-trivializable graphs and non-planar graphs. In particular, we show that the complete graph on n vertices and the complete bipartite graph on $m+n$ vertices have a completely distinguishable projection. Furthermore we mention the relationship between the *minimal crossing number* of a graph and its completely distinguishable projection.

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