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Matching complexes that are combinatorial manifolds.

The matching complex of a graph is the simplicial complex whose vertex set is the set of edges of the graph with a face for each independent set of edges. While much research has been done on the topology of matching complexes of specific classes of graphs, this work takes the opposite perspective: which complexes in a class of simplicial complexes are matching complexes? We completely characterize the pairs (graph, matching complex) for which the matching complex is a combinatorial manifold, with or without boundary. For dimension three and higher these complexes are all spheres and balls. A variety of examples occur in dimension two. (Received August 20, 2019)