Combinatorial Aspects in Graph Drawing

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Given a graph G, a drawing Γ of G is a function that maps each vertex v to a distinct point $\Gamma(v)$ in the plane and each edge uv to a simple open Jordan curve $\Gamma(uv)$ with endpoints u and v. Graph drawing, in general, deals with automatic generation of drawings for a given graph. There are different standards for drawing a graph. In this paper we emphasis on combinatorial aspects of graph drawing. We present necessary and sufficient combinatorial condition for an embedded graph with given shape to have orthogonal drawing, and for a digraph to have upward drawing in the plane. Then we extend the results to higher dimensions and some surfaces.