Summary: We present a new model for hybrid planarity that relaxes existing hybrid representation models. A graph $G = (V, E)$ is $(k, p)$-planar if $V$ can be partitioned into clusters of size at most $k$ such that $G$ admits a drawing where: (i) each cluster is associated with a closed, bounded planar region, called a cluster region; (ii) cluster regions are pairwise disjoint, (iii) each vertex $v \in V$ is identified with at most $p$ distinct points, called ports, on the boundary of its cluster region; (iv) each inter-cluster edge $(u, v) \in E$ is identified with a Jordan arc connecting a port of $u$ to a port of $v$; (v) inter-cluster edges do not cross or intersect cluster regions except at their end-points. We first tightly bound the number of edges in a $(k, p)$-planar graph with $p < k$. We then prove that $(4, 1)$-planarity testing and $(2, 2)$-planarity testing are NP-complete problems. Finally, we prove that neither the class of $(2, 2)$-planar graphs nor the class of 1-planar graphs contains the other, indicating that the $(k, p)$-planar graphs are a large and novel class.

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