

# On the Maximum Genus of Planar Graphs

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## Abstract

The maximum genus of a connected graph  $G$  is the maximum integer  $g$  for which  $G$  has a cellular embedding in the orientable surface  $S_g$ . We present the two main methods of calculating the maximum genus contributed by Xuong and Nebeský and survey results on the connection between matchings on intersection graphs and the maximum genus. We introduce a novel class of intersection graphs called *facial intersection graphs* defined for a given planar embedding and show that for particular embedding properties the maximum genus can be calculated from the given embedding using a simple matching algorithm.

**Keywords:** graph, genus, cellular embedding.