A criterion for (non-)planarity of the transformation graph G^{xyz} when $xyz = -++$

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Abstract

The transformation graph G^{-++} of G is the graph with vertex set $V(G) \cup E(G)$ in which the vertex x and y are joined by an edge if one of the following conditions holds: (i) $x, y \in V(G)$ and x and y are not adjacent in G, (ii) $x, y \in E(G)$ and x and y are adjacent in G, (iii) one of x and y is in $V(G)$ and the other is in $E(G)$, and they are incident in G. In this paper we present characterizations of graphs whose transformation graphs G^{-++} are eulerian, outerplanar, maximal outerplanar or minimally nonouterplanar. Further we establish a necessary and sufficient condition for the transformation graphs G^{-++} to have crossing number one or two.

Keywords and phrases : *Eulerian, outerplanar, maximal outerplanar, minimally nonouterplanar.*