ON THE CROSSING NUMBER OF PRODUCTS OF 6-VERTEX GRAPHS WITH PATHS

Marián Klešč and Jana Petrillová
Faculty of Electrical Engineering and Informatics
Technical University of Košice

e-mail: marian.klesc@tuke.sk, jana.petrillova@tuke.sk

Let $G_1$ and $G_2$ be simple graphs with vertex sets $V(G_1)$ and $V(G_2)$, and edge sets $E(G_1)$ and $E(G_2)$. The Cartesian product $G_1 \times G_2$ of graphs $G_1$ and $G_2$ has vertex set $V(G_1 \times G_2) = V(G_1) \times V(G_2)$ and any two vertices $(u, u')$ and $(v, v')$ are adjacent in $G_1 \times G_2$ if and only if either $u = v$ and $u'$ is adjacent with $v'$ in $G_2$, or $u' = v'$ and $u$ is adjacent with $v$ in $G_1$. The crossing number, $cr(G)$, of a graph $G$ is the minimal number of pairwise intersections of nonadjacent edges in any drawing of $G$ in the plane.

There are known exact values concerning the crossing numbers of the Cartesian product of paths, cycles and stars with some graphs of order four and five (see [1], [3], [4]). The similar problem was solved in [2] also for the Cartesian product of cycles with 6-vertex trees. The aim of this presentation is to determine the crossing numbers of the Cartesian product of the path $P_n$ on $n$ edges with some graphs of order six. We give first the crossing number of the Cartesian product of the special graph $H$ on six vertices with the path and then we use this result to find crossing numbers of Cartesian product of another 6-vertex graphs with the path $P_n$.

Keywords: graph, drawing, crossing number, Cartesian product.

AMS Subject Classification: 05C10, 05C38.

References


