Mathematics > Combinatorics

On the metric dimension of line graphs

Min Feng, Min Xu, Kaishun Wang

(Submitted on 20 Jul 2011)

Let G be a (di)graph. A set W of vertices in G is a \emph{resolving set} of G if every vertex u of G is uniquely determined by its vector of distances to all the vertices in W. The \emph{metric dimension} $\mu (G)$ of G is the minimum cardinality of all the resolving sets of G. C\'aceres et al. \cite{Ca2} computed the metric dimension of the line graphs of complete bipartite graphs. Recently, Bailey and Cameron \cite{Ba} computed the metric dimension of the line graphs of complete graphs. In this paper we study the metric dimension of the line graph $L(G)$ of G. In particular, we show that $\mu(L(G))=|E(G)|-|V(G)|$ for a strongly connected digraph G except for directed cycles, where $V(G)$ is the vertex set and $E(G)$ is the edge set of G. As a corollary, the metric dimension of de Brujin digraphs and Kautz digraphs is given. Moreover, we prove that $\lceil\log_2\Delta(G)\rceil\leq\mu(L(G))\leq |V(G)|-2$ for a simple connected graph G with at least five vertices, where $\Delta(G)$ is the maximum degree of G. Finally, we obtain the metric dimension of the line graph of a tree in terms of its parameters.

Comments: 7 pages
Subjects: **Combinatorics (math.CO)**
Cite as: **arXiv:1107.4140 [math.CO]**
(or **arXiv:1107.4140v1 [math.CO]** for this version)

Submission history

From: Kaishun Wang [view email]
[v1] Wed, 20 Jul 2011 23:34:34 GMT (7kb)

Which authors of this paper are endorsers?