运筹学学报
Operations Research Transactions

运筹学学报 » 2012, Vol. 16 » Issue (2) :23-31 DOI:

运筹学

Q整图新类

王力工[1], 陈彦青[1]

1. 西北工业大学理学院应用数学系，西安，710072

Some new families of Q-integral graphs

WANG Li-Gong[1], CHEN Yan-Qing[1]

1. Department of Applied Mathematics, School of Science, Northwestern Polytechnical University, Xi'an, 710072, China

摘要 对于一个简单图G, 方阵Q(G)=D(G)+A(G)称为G的无符号拉普拉斯矩阵,其中D(G)和A(G)分别为G的度对角矩阵和邻接矩阵. 一个图是Q整图是指该图的无符号拉普拉斯矩阵的特征值全部为整数.首先通过Stanic 得到的六个顶点数目较小的Q整图，构造出了六类具有无穷多个的非正则的Q整图. 进而,通过图的笛卡尔积运算得到了很多的Q整图类. 最后, 得到了一些正则的Q整图.

关键词： 无符号拉普拉斯谱 Q整图 整图 整特征值

Abstract: Let G be a simple graph. The matrix Q(G)=D(G)+A(G) denotes the signless Laplacian matrix of G, where D(G) and A(G) denote the diagonal matrix and the adjacency matrix of G respectively. A graph is called Q-integral if its signless Laplacian spectrum consists entirely of integers. In this paper, we firstly construct six infinite classes of nonregular Q-integral graphs from the known six smaller Q-integral graphs identified by Stani\'{c}. Furthermore, we obtain large families of Q-integral graphs by the Cartesian product of graphs. Finally, we obtain some regular Q-integral graphs.

Keywords: signless Laplacian spectrum, Q-integral graph, integral graph, integral eigenvalues

通讯作者 王力工

引用本文:
王力工, 陈彦青 .Q整图新类[J] 运筹学学报, 2012,V16(2): 23-31

Wang-Li-Gong, CHEN Yan-Qing .Some new families of Q-integral graphs[J] OR TRANSACTIONS, 2012,V16(2): 23-31
链接本文:
http://202.120.127.195/shu_ycxxb/CN/ 或 http://202.120.127.195/shu_ycxxb/CN/Y2012/V16/I2/23

[1] Cvetkovic D, Rowlinson P, Simic S. Signless Laplacian of finite graphs [J]. Linear Algebra Appl, 2007, 423: 155-171.

[2] Grone R, Merris R, Sunder V S. The Laplacian spectrum of a graph [J]. SIAM J Matrix Anal Appl, 1990, 11: 218-238.

[3] Merris R. Laplacian graph eigenvectors [J]. Linear Algebra Appl, 1998, 278: 221-236.

[4] Merris R. Multilinear Algebra [M]. New York: Gordon & Breach, 1997.

[5] Petrovic M, Radosavljevic Z. Spectrally Constrained Graphs [M]. Kragujevac: Faculty of Science, 2001.

[6] Simic S K, Stanic Z. Q-integral graphs with edge-degrees at most five [J]. Discrete Math, 2008, 308: 4625-4634.

[7] Stanic Z. There are exactly 172 connected Q-integral graphs up to 10 vertices [J]. Novi Sad J Math, 2007, 37(2): 193-205.