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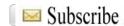
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CUSA, Room 312
Lord Fulton Center
The Chinese University of Hong Kong
Shatin, Hong Kong
China (SAR)
Tel: (852) 2609 6600
Fax: (852) 2603 6363
kpshum@e.cuhk.edu.hk

Kunming: H.K. Yang
Editorial Office of Southeast Asian Bulletin of Mathematics
Yunnan University
Kunming 650091, China
Tel: 86 (871) 5031445
Fax: 86 (871) 5031445
hkyang@ynu.edu.cn

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On the Connectedness of Square Element Graphs over Arbitrary Rings

Bijon Biswas   and   Raibatak Sen Gupta

Department of Mathematics, Jadavpur University, Kolkata-700032, India
Email: bijonsujan@gmail.com; raibatak2010@gmail.com

M. K. Sen

Department of Pure Mathematics, University of Calcutta, 35, Ballygunge Circular Road, Kolkata-700019, India
Email: senmk6@yahoo.com

Sukhendu Kar

Department of Mathematics, Jadavpur University, Kolkata-700032, India
Email: karsukhendu@yahoo.co.in

Abstract. In this paper, we continue our study of the square element graph which is defined as follows: if R is a ring then the square element graph $\mathbb{S}q(R)$ is the simple undirected graph whose vertex set consists of all non-zero elements of R, and two vertices u, v are adjacent if and only if $u + v = x^2$ for some $x \in R - \{0\}$. Here we mainly consider the connectedness of $\mathbb{S}q(R)$ over different rings. We particularly look at $\mathbb{S}q(R)$ taken over some infinite rings which contain $\mathbb{Z}$ as a subring. For a ring R and an ideal I of R, the relation between the connectedness of $\mathbb{S}q(R)$ and $\mathbb{S}q(R/I)$ is studied. Finally, connectedness of $\mathbb{S}q(R)$ over various polynomial rings and matrix rings are considered.