

On Compression of Zero-divisor Graphs of Rings

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Abstract

Let R be a commutative ring with $1 \neq 0$. The zero-divisor graph $\Gamma(R)$ of R is the (undirected) graph whose vertices are the nonzero zero-divisors of R such that two distinct vertices x and y are adjacent if and only if $xy = 0$. A compressed zero-divisor graph of a ring R is the undirected graph $\Gamma_c(R)$ with vertex set $Z(R_e) \setminus \{[0]\}$ defined by $Z(R_e) = \{[x] : x \in R\}$ where $[x] = \{y \in R : ann(x) = ann(y)\}$ and the two distinct vertices $[x]$ and $[y]$ are adjacent if and only if $[x][y] = [xy] = [0]$ if and only if $xy = 0$. In this talk, we study the geometric properties of the graph $\Gamma_c(R)$ using graph theoretical tools to explore some interesting results in the algebraic structures. We discuss the notion of metric dimension of $\Gamma_c(R)$ and compare it with the earlier zero-divisor graph $\Gamma(R)$ of a ring R . We also obtain the bounds for the metric dimension of this graph $\Gamma_c(R)$.

Keywords: Zero divisor graph, Compressed zero divisor graph, Metric dimension

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