Some Results on the Annihilating-Ideal Graphs

Farzad Shaveisi

Abstract. The annihilating-ideal graph of a commutative ring R, denoted by $\mathbb{AG}(R)$, is a graph whose vertex set consists of all non-zero annihilating ideals and two distinct vertices I and J are adjacent if and only if $IJ = (0)$. Here, we show that if R is a reduced ring and the independence number of $\mathbb{AG}(R)$ is finite, then the edge chromatic number of $\mathbb{AG}(R)$ equals its maximum degree and this number equals $2^{|\mathrm{Min}(R)|-1} - 1$; also, it is proved that the independence number of $\mathbb{AG}(R)$ equals $2^{|\mathrm{Min}(R)|-1}$, where $\mathrm{Min}(R)$ denotes the set of minimal prime ideals of R. Then we give some criteria for a graph to be isomorphic with an annihilating-ideal graph of a ring. For example, it is shown that every bipartite annihilating-ideal graph is a complete bipartite graph with at most two horns. Among other results, it is shown that a finite graph $\mathbb{AG}(R)$ is not Eulerian, and it is Hamiltonian if and only if R contains no Gorenstain ring as its direct summand.