Some Results on the Annihilating-Ideal Graphs
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Abstract. The annihilating-ideal graph of a commutative ring $R$, denoted by $\text{AG}(R)$, 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 $\text{AG}(R)$ is finite, then the edge chromatic number of $\text{AG}(R)$ equals its maximum degree and this number equals $2^{\left|\text{Min}(R)\right|-1} - 1$; also, it is proved that the independence number of $\text{AG}(R)$ equals $2^{\left|\text{Min}(R)\right|-1}$, where $\text{Min}(R)$ 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 $\text{AG}(R)$ is not Eulerian, and it is Hamiltonian if and only if $R$ contains no Gorenstain ring as its direct summand.