

## عنوان مقاله:

Annihilating submodule graph for modules

## محل انتشار:

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## خلاصه مقاله:

Let  $R$  be a commutative ring and  $M$  an  $R$ -module. In this article, we introduce a new generalization of the annihilating-ideal graph of commutative rings to modules. The annihilating submodule graph of  $M$ , denoted by  $\text{Bbb G}(M)$ , is an undirected graph with vertex set  $\text{Bbb A}^*(M)$  and two distinct elements  $N$  and  $K$  of  $\text{Bbb A}^*(M)$  are adjacent if  $N^*K = 0$ . In this paper we show that  $\text{Bbb G}(M)$  is a connected graph,  $\text{diam}(\text{Bbb G}(M)) \leq 3$ , and  $\text{gr}(\text{Bbb G}(M)) \leq 4$  if  $\text{Bbb G}(M)$  contains a cycle. Moreover,  $\text{Bbb G}(M)$  is an empty graph if and only if  $\text{ann}(M)$  is a prime ideal of  $R$  and  $\text{Bbb A}^*(M) \neq \text{Bbb S}(M) \setminus \{0\}$  if and only if  $M$  is a uniform  $R$ -module,  $\text{ann}(M)$  is a semi-prime ideal of  $R$  and  $\text{Bbb A}^*(M) \neq \text{Bbb S}(M) \setminus \{0\}$ . Furthermore,  $R$  is a field if and only if  $\text{Bbb G}(M)$  is a complete graph, for every  $M \in R\text{-Mod}$ . If  $R$  is a domain, for every divisible module  $M \in R\text{-Mod}$ ,  $\text{Bbb G}(M)$  is a complete graph with  $\text{Bbb A}^*(M) = \text{Bbb S}(M) \setminus \{0\}$ . Among other things, the properties of a reduced  $R$ -module  $M$  are investigated when  $\text{Bbb G}(M)$  is a bipartite graph.

## کلمات کلیدی:

Module, Annihilating submodule graph, Complete graph

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