



Math for the people, by the people.

annihilator is an ideal

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The right annihilator of a right R -module M_R in R is an ideal.

Proof:

By the distributive law for modules, it is easy to see that $\text{r.ann}(M_R)$ is closed under addition and right multiplication. Now take $x \in \text{r.ann}(M_R)$ and $r \in R$.

Take any $m \in M_R$. Then $mr \in M_R$, but then $(mr)x = 0$ since $x \in \text{r.ann}(M_R)$. So $m(rx) = 0$ and $rx \in \text{r.ann}(M_R)$.

An equivalent result holds for left annihilators.