

THE UNIVERSITY OF CHICAGO DEPARTMENT OF MATHEMATICS COURSE 581: ADVANCED TOPICS IN ALGEBRA

Let R be a commutative ring. For any R -module M , we define the annihilator of M to be the ideal $\text{Ann}_R(M) = \{r \in R \mid rM = 0\}$. If M is a finitely generated R -module, then $\text{Ann}_R(M)$ is a nonzero ideal of R . In fact, if M is a finitely generated R -module, then $\text{Ann}_R(M)$ is the intersection of the annihilators of the elements of M . If M is a finitely generated R -module, then $\text{Ann}_R(M)$ is the intersection of the annihilators of the elements of M . If M is a finitely generated R -module, then $\text{Ann}_R(M)$ is the intersection of the annihilators of the elements of M .

1. Let R be a commutative ring. For any R -module M , we define the annihilator of M to be the ideal $\text{Ann}_R(M) = \{r \in R \mid rM = 0\}$. If M is a finitely generated R -module, then $\text{Ann}_R(M)$ is a nonzero ideal of R . In fact, if M is a finitely generated R -module, then $\text{Ann}_R(M)$ is the intersection of the annihilators of the elements of M .

2. Let R be a commutative ring. For any R -module M , we define the annihilator of M to be the ideal $\text{Ann}_R(M) = \{r \in R \mid rM = 0\}$. If M is a finitely generated R -module, then $\text{Ann}_R(M)$ is a nonzero ideal of R . In fact, if M is a finitely generated R -module, then $\text{Ann}_R(M)$ is the intersection of the annihilators of the elements of M .

3. Let R be a commutative ring. For any R -module M , we define the annihilator of M to be the ideal $\text{Ann}_R(M) = \{r \in R \mid rM = 0\}$. If M is a finitely generated R -module, then $\text{Ann}_R(M)$ is a nonzero ideal of R . In fact, if M is a finitely generated R -module, then $\text{Ann}_R(M)$ is the intersection of the annihilators of the elements of M .

4. Let R be a commutative ring. For any R -module M , we define the annihilator of M to be the ideal $\text{Ann}_R(M) = \{r \in R \mid rM = 0\}$. If M is a finitely generated R -module, then $\text{Ann}_R(M)$ is a nonzero ideal of R . In fact, if M is a finitely generated R -module, then $\text{Ann}_R(M)$ is the intersection of the annihilators of the elements of M . If M is a finitely generated R -module, then $\text{Ann}_R(M)$ is the intersection of the annihilators of the elements of M . If M is a finitely generated R -module, then $\text{Ann}_R(M)$ is the intersection of the annihilators of the elements of M .

5. Let R be a commutative ring. For any R -module M , we define the annihilator of M to be the ideal $\text{Ann}_R(M) = \{r \in R \mid rM = 0\}$. If M is a finitely generated R -module, then $\text{Ann}_R(M)$ is a nonzero ideal of R . In fact, if M is a finitely generated R -module, then $\text{Ann}_R(M)$ is the intersection of the annihilators of the elements of M .



1. $\frac{1}{2} \frac{d}{dt} \left(\frac{1}{2} m v^2 \right) = \frac{1}{2} m v \frac{dv}{dt}$
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