

Commutative Ring Theory Days 2010

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ZERO DIVISOR CONDITIONS IN COMMUTATIVE GROUP RINGS

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Let R be a commutative ring, and let G be an abelian group. The most restrictive zero divisor condition one can impose on a ring R is to require that R be a domain. Viewed from the homological perspective, this requirement becomes a statement concerning principal ideals of R . In fact, this can be extended to the setting RG where G is torsion-free. More generally, we can speak of the following less restrictive zero divisor conditions in R :

1. R is a PF ring, i.e. every principal ideal of R is flat.
2. R is a PP ring, i.e. every principal ideal of R is projective.
3. The total ring of quotients of R , denoted $Q(R)$, is von Neumann regular.
4. The set of minimal primes of R , denoted $\text{Min } R$, is compact in the Zariski topology.

In this talk, we'll discuss the relationships between these conditions in R and in RG where G is torsion-free. Using these characterizations, we'll construct examples of group rings RG which exhibit some of the above properties.

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