

# Commutative Ring Theory Days 2010

May 19-20-21, 2010

Roma, Italy

## PRÜFER-LIKE CONDITIONS IN COMMUTATIVE GROUP RINGS

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Let  $R$  be a commutative ring, and let  $f$  be a polynomial with coefficients in  $R$ . Denote by  $c(f)$ , the *content* of  $f$ , the ideal of  $R$  generated by the coefficients of  $f$ . A ring  $R$  is called a *Gaussian ring* if  $c(f)c(g) = c(fg)$  for any two polynomials  $f$  and  $g$  with coefficients in  $R$ . Gaussian rings were defined by Tsang in 1965, and became an active topic of investigation due to their connection to Kaplansky's conjecture, which was solved between 1997 and 2005. The focus of these investigations lied in the comparison between the Gaussian property and several related Prüfer-like ring theoretic and homological properties. Specifically the properties under consideration are:

1.  $R$  is a semihereditary ring.
2.  $w.\dim R \leq 1$ .
3.  $R$  is an arithmetical ring.
4.  $R$  is a Gaussian ring.
5.  $R$  is locally a Prüfer ring.
6.  $R$  is a Prüfer ring.

This talk will discuss the behavior of the six Prüfer-like properties in commutative group rings. In particular, we will consider several results and counterexamples, obtained by the speaker, to questions of ascent and descent of these properties between the ring  $R$  and the group ring  $RG$ , for an abelian group  $G$ .

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