Commutative Ring Theory Days 2010

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VON NEUMANN REGULAR AND RELATED ELEMENTS IN COMMUTATIVE RINGS

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Let R be a commutative ring with nonzero identity. In this paper, we study the von Neumann regular elements of R, that is, $a \in R$ such that $a^2x = a$ for some $x \in R$. We also study the idempotent elements, π-regular elements (i.e., $a \in R$ such that $a^{2n}x = a^n$ for some $x \in R$ and integer $n \geq 1$), the von Neumann local elements (i.e., $a \in R$ such that either a or $1 - a$ is von Neumann regular), and the clean elements of R (i.e., elements of R that are the sum of a unit and an idempotent of R). Finally, we investigate the subgraphs of the zero-divisor graph $\Gamma(R)$ of R induced by the above elements.

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