N-ZERO-DIVISOR GRAPH OF A COMMUTATIVE SEMIGROUP

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ABSTRACT. Let S be a (multiplicative) commutative semigroup with 0, $Z(S)$ the set of zero-divisors of S, and n a positive integer. The classical *zero-divisor graph* of S is the (simple) graph $\Gamma(S)$ with vertices $Z(S)^* = Z(S) \setminus \{0\}$, and distinct vertices x and y are adjacent if and only if $xy = 0$. In this talk, we introduce and study the *n-zero-divisor graph* of S as the (simple) graph $\Gamma_n(S)$ with vertices $Z_n(S)^* = \{x^n \mid x \in Z(S)\} \setminus \{0\}$, and distinct vertices x and y are adjacent if and only if $xy = 0$. Thus each $\Gamma_n(S)$ is an induced subgraph of $\Gamma(S) = \Gamma_1(S)$. We pay particular attention to $diam(\Gamma_n(S))$, $gr(\Gamma_n(S))$, and the case when S is a commutative ring with $1 \neq 0$.

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