COHEN-MACAULEYNESS OF THE ZERO-DIVISOR GRAPH OF A BOOLEAN POSET

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Abstract. In this paper, we prove that the zero-divisor graph $\Gamma(P)$ of a Boolean poset P is both well-covered and Cohen–Macaulay. Furthermore, for a poset $\mathbf{P} = \prod_{i=1}^{n} P_i$ $(n \geq 3)$, where each P_i is a finite bounded poset satisfying $Z(P_i) = \{0\}$ for all i, and $2 \leq |P_1| \leq |P_2| \leq \cdots \leq |P_n|$, we show that the zero-divisor graph $\Gamma(\mathbf{P})$ is Cohen–Macaulay if and only if $\mathbf{P}$ is a Boolean lattice.

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