The total graphs of finite commutative semirings

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Recently, a lot of study of algebraic structures has been explored via the graph theoretic approach. In the talk, we introduce the total graph of a semiring as the graph with all elements of the semiring as vertices, and two distinct vertices x and y are adjacent if and only if $x + y$ is a zero-divisor.

We present the characterization of finite commutative semirings having the total graph without any 3-cycles. In case the semiring has a cyclic total graph without any 3-cycles, the semiring actually has to be a ring $\mathbb{Z}_2 \times \mathbb{Z}_2$. We also give a characterization of semirings having an acyclic total graph.

This is a joint work with D. DOLŽAN (University of Ljubljana).