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QUASI-PRIME IDEALS OF NOETHERIAN SEMIRINGS

Ivanna Melnyk

Ivan Franko National University of Lviv

ivannamelnyk@yahoo.com

This work is devoted to the investigation of commutative semirings with derivations and ascending chain condition.

A differential ideal I of the semiring R is called *quasi-prime* if there exists a multiplicatively closed subset S of R such that I is maximal differential ideal such that $I \cap S = \varnothing$. For a subset A of R the set $A_{\#} = \left\{ a \in R \,\middle|\, a^{(n)} \in A \,\text{for all}\, n \in \mathbb{N}_0 \right\}$ is called the *differential* of A. A differential k-ideal P of R is called *differentially prime* if for any $a, b \in R$, $k \in \mathbb{N}_0$, $ab^{(k)} \in P$ follows $a \in P$ or $b \in P$.

Theorem 1. *Let R be a Noetherian semiring. If the k-ideal P of R is differentially prime, then P is a primary k-ideal of R.*

Theorem 2. *For every differential k-ideal I of the Noetherian semiring R the following are equivalent:*

1. *I is a quasi-prime k-ideal;*
2. *I is a differentially prime k-ideal;*
3. *$I = P_{\#}$ for some prime k-ideal P of R.*

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http://iapmm.lviv.ua/mpmm2023/materials/ma10_11.pdf