YEDİTEPE UNIVERSITY

MATHEMATICS DEPARTMENT 25TH YEAR SEMINARS

Socle of Incidence Rings

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Abstract: In his seminal paper of 1964, "On the foundations of combinatorial theory I: Theory of Möbius Functions" Gian-Carlo Rota defined an incidence ring as a tool for solving combinatorial problems. Incidence ring is a specific ring of functions defined on the ordered pairs of a given partially ordered set to a given ring. Möbius function is an element of an incidence ring, besides with the appropriate choice of the partially ordered set, Möbius function of this incidence algebra coincides with the well-known Möbius function of number theory. A product of copies of a ring and upper triangular matrices are typical examples of incidence algebras.

The investigation of a ring is usually enriched by understanding special types of ideals of it, such as the Jacobson radical, the prime radical, the socle,the singular ideal, the center, etc. Although incidence rings have been an object of study for a few decades, there does not seem to be any results in the literature on the socle of incidence rings.

In this talk, we will be restricting the left socle of an incidence ring between two sets.More explicitly, we compute the socle of an incidence ring $I(X, R)$ under some assumptions on the ring R and/or the partially ordered set X. (This joint work with Özkay Özkan- doi.org/10.15672/hujms.684042)

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