

ABSTRACT

A Study of Sharma-Kaushik Partitions and Some Related Schemes

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Partitions of sets are important combinatorial tools in some areas of Mathematics and have been studied and applied extensively. The concept of metric (distance) is basic in Mathematics, having been used in Functional Analysis and Coding Theory. The only systematic approach to relating partitions of sets and metrics is to be found in the work of Sharma and Kaushik (1977) and Kaushik (1977d), who defined partitions which induce metrics on the ring of integers modulo q , where q is a positive integer greater than or equal to 2. We call these partitions SK-partitions. No attempt has been made to relate SK-partitions to important combinatorial structures like association schemes and matrices. In this thesis, we fill this gap.

We investigate combinatorial and topological aspects of SK-partitions and structures that we call extended association schemes, which are defined in terms of SK-partitions. We make use of Lattice Theory, which gives us unifying language for studying SK-partitions and extended association schemes.

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