

Abstract

The concept of the association scheme was defined in its own right by R. C. Bose and T. Shimamoto in 1952. Since it has close connections with coding theory, graph theory and finite group theory, and in particular, provide a framework for studying codes and designs. By 1980s, association scheme theory became an important branch of algebraic combinatorics and the research work on association scheme theory had grown tremendously.

In the mid 1960s, Professor Zhexian Wan constructed a family of association schemes on Hermitian matrices and computed the parameters of the lower dimensional ones and started a new direction of construction of association schemes on matrices. Later, Professor Yangxian Wang, with his students, studied the association schemes of rectangular matrices, alternate matrices, Hermitian matrices, symmetric matrices and quadratic forms in even characteristic. So the study of association schemes of matrices reaches to a more complete stage.

In this talk, we take the association scheme of rectangular matrices as an example, construct a class of new association schemes based on geometry of symplectic group over finite field, compute its parameters, and determine its automorphism group.