

ISOMORPHISM THEOREMS OF LINEAR GROUPS

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The goal in this thesis is the isomorphism theory of linear groups over fields as shown by the theorem

Theorem: There is an isomorphism between any subset of the (projective) collinear transformations, (projective) general linear groups or (projective) special linear groups for dimension ≥ 3 if and only if the dimensions of the finite dimensional vector spaces of these subspaces are equal and the underlying fields of these vector spaces are isomorphic.

The theory that follows is typical of much of the research between the years 50's and 60's on the isomorphisms of the classical groups over rings. The thesis will start from the basic facts of calculus of residues and transvections. Then, in particular, the fundamental theorem of projective geometry will be proved and whatever is needed from projective geometry will be developed. Via reorganizing the literature on the isomorphisms of the classical groups, it will be possible to extend the known theory from groups of linear transformations to groups of collinear transformations, and also to improve the isomorphism theory from dimension ≥ 5 to dimension ≥ 3 .