PROJECTIVE STRUCTURES OF ELLIPTIC
DIFFERENTIAL OPERATORS

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Dedicated to Professor Nobuo Shimada on his 60-th birthday

Introduction

In the study of differential equations from the standpoint of the automorphism pseudogroups, the differential invariants of the pseudogroups play an important role.

A general study of pseudogroups and their differential invariants originated with Sophus Lie. He applied his study to the classification of ordinary and partial differential equations. So as to study differential equations from his point of view, it is very important to write the given differential equation by the differential invariants of the automorphism pseudogroup. That is to say, the geometric structure of a differential equation is contained in the expression of the equation by its differential invariants.

In this paper we shall deal with elliptic systems of differential equations which admit the automorphism pseudogroup generated by the maximal subgroup G of the affine transformation group of the m-dimensional linear space R^m whose linear part is the center of $GL(m, R)$.

These systems of differential equations will be proved to admit projective structures of some type. Thus elliptic systems of differential equations whose automorphism pseudogroups are generated by G will be called projective.

In Section 1 we study the automorphism pseudogroups of elliptic differential equations of second order. There we shall show that they are generated by subgroups of the affine transformation group of R^m (Proposition 3.1).

In Section 2 we investigate canonical generators of projective elliptic

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