HIROSHIMA MATH. J.
9 (1979), 61–135

A Two Point Connection Problem

Mitsuhiko KOHNO

(Received September 4, 1978)

§1. Introduction

A two point connection problem for linear ordinary differential equations in the whole complex plane is to seek the explicit connection formulas between two fundamental sets of solutions locally defined and to analyze global behaviors of solutions. In this paper we shall be concerned with the system of linear differential equations

$$(1.1)\qquad t\frac{dX}{dt} = (A_0 + A_1 t + \cdots + A_q t^q)X,$$

where the coefficients A_i $(i=0, 1,\dots, q)$ are n by n constant matrices, and derive the connection formulas between two fundamental sets of solutions in neighborhoods of $t=0$ and $t=\infty$.

The origin $t=0$ is a regular singularity of (1.1). According to the local theory of systems of linear differential equations (see W. Wasow [23, Chapters II and V]), an application of a finite number of constant transformations and the so-called shearing transformations reduces (1.1) to a system of linear differential equations in which the leading coefficient matrix is of the following Jordan canonical form:

$$(1.2)\qquad \hat{A}_0 = \begin{pmatrix} \mathscr{A}_1 & & & 0 \\ & \mathscr{A}_2 & & \\ & & \ddots & \\ 0 & & & \mathscr{A}_\nu \end{pmatrix}, \ \mathscr{A}_i = \rho_i + J_i{}^{*)} \qquad (i = 1, 2,\dots, \nu),$$

*) Throughout this paper, as in this expression, use will be made of the notation that a scalar in the matrix representation denotes a diagonal matrix whose diagonal elements equal that scalar.