ON INTEGRALS OF THE CERTAIN ORDINARY DIFFERENTIAL EQUATIONS IN THE VICINITY OF THE SINGULARITY. II.

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(Received July, 30, 1950)

§ 1. Introduction.

In our previous paper[1], under generalized Poincaré's condition or Picard's condition, we have solved the equation as follows:

$$\sum_{i=1}^{n} X_i \frac{\partial f}{\partial x_i} = 0, \tag{1.1}$$

where $X_i(x)$ are regular in the vicinity of $x_i=0$ and are expanded as follows:

$X_i(x)=\sum_{j=1}^{n} a_{ij}x_j+$ sum of the terms of the second and higher orders.

Let the eigen values of the matrix $A=\| a_{ij} \|$ be λ_i. The generalized Poincaré's condition is as follows: *all λ_i's lie in a convex domain Ω which does not contain the origin.* The generalized Picard's condition is as follows: *some of λ_i lie in a convex domain Ω which does not contain the origin.* In this paper, making use of solutions of (1.1), we are going to obtain integrals of the ordinary differential equations as follows;

$$\frac{dx_1}{X_1} = \frac{dx_2}{X_2} = \cdots\cdots = \frac{dx_n}{X_n}. \tag{1.2}$$

By our previous paper[2], without loss of generality, we can assume that A is of Jordan's form and that the real parts of λ_i lying in Ω are positive. As in (A), we write X_i as follows:

$$X^i_{ip}=\lambda_i x^i_{ip}+\delta_p x^i_{ip-1}+\cdots\cdots\cdots,$$

where the unwritten terms are of the second and higher orders, and δ_p is equal to 1 or zero according as $p\geqq 2$ or $p=1$.

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1) M. Urabe, *On Solutions of the Linear Homogeneous Partial Differential Equation in the Vicinity of the Singularity, III.* This Journal, Vol. 15, No. 1, p. 25. In the following, we denote this paper by (A).

2) M. Urabe, *On Integrals of the Certain Ordinary Differential Equations in the Vicinity of the Singularity, I.* This Journal, Vol. 14, No. 3, p. 209. In the following, we denote this paper by (B).