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Iteration of Certain Finite Transformation (Continued).

By

Minoru URABE

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Chapter II. Transformation of Type *B*.

§ 6. Condition I.

We consider the transformation of the form as follows:

$$T:\ 'x^\nu=\varphi^\nu(x)=x^\nu+a^\nu_{\lambda_1\cdots\lambda_N}x^{\lambda_1}\cdots x^{\lambda_N}+\cdots, \qquad (N\geqq 3) \tag{6.1}$$

where at least one of $a^\nu_{\lambda_1\cdots\lambda_N}$'s does not vanish.

Quite similarly as in § 1, we have

Theorem 1'. *For the transformation* (6.1), *we put as follows:*

$$a^\nu_{\lambda_1\cdots\lambda_N}=R^\nu_{\lambda_1\cdots\lambda_N}e^{'\Omega^\nu_{\lambda_1\cdots\lambda_N}},\quad '\Omega^\nu_{\lambda_1\cdots\lambda_N}+\omega_{\lambda_1}+\cdots+\omega_{\lambda_N}-\omega_\nu=\Omega^\nu_{\lambda_1\cdots\lambda_N}.$$

We consider the function as follows:

$$\begin{aligned}R&=R(r,\omega;\ \rho,\theta)\\&=\sum_{\lambda_1,\cdots,\lambda_N,\nu}R^\nu_{\lambda_1\cdots\lambda_N}\sigma_{\lambda_1}\cdots\sigma_{\lambda_N}\rho_\nu\cos(\Omega^\nu_{\lambda_1\cdots\lambda_N}+\phi_{\lambda_1}+\cdots+\phi_{\lambda_N}-\theta_\nu),\end{aligned}$$

where

$\sigma_\lambda=r_\lambda$ *or* ρ_λ,

$\phi_\lambda=0$ *or* θ_λ *according as* $\sigma_\lambda=r_\lambda$ *or* $\sigma_\lambda=\rho_\lambda$,

$r_\lambda,\rho_\lambda\geqq 0$ *and* $\sum_\lambda r_\lambda^2=\sum_\lambda\rho_\lambda^2=1$.

We assume that there exists a set of (r_ν,ω_ν) *such that* $R<0$ *for all* (ρ_ν,θ_ν) *except for* $(\rho_\nu=r_\nu,\ \theta_\nu=\pi)$, *and that* $\left[\dfrac{d^P}{d\varepsilon^P}R(r,\omega;\ r_\nu+\varepsilon\eta_\nu,\ \pi+\varepsilon\varepsilon^\nu)\right]_{\varepsilon=0}\neq 0$ *for any* $(\eta_\nu,\varepsilon_\nu)$ *such that* $|\eta_\nu|,|\varepsilon_\nu|\leqq 1$ *except for* $\eta_\nu=\varepsilon_\nu=0$, *where* $P=N$ *or* $N+1$ *according as* N *is even or odd. Then, in the space* E_{2n} *of the complex numbers* x^ν*'s, there exists a small hypersphere passing through the origin with the center* $\alpha^\nu=rr_\nu e^{i\omega_\nu}$ *and with the radius* r, *such that all the points of that hypersphere converge to the origin remaining in it when* T *is infinitely iterated on these points.*