

Professor M. Hukuhara started his scientific career with his important paper on the existence of the maximal and the minimal solutions of ordinary differential equations which was published when he was a student of the late Professor T. Yosie at the University of Tokyo. Since then he has done pioneering research in this country on the basic theory of ordinary differential equations in collaboration with his senior friend, Professor M. Nagumo. Thus he has contributed many important papers on the existence, the uniqueness, the theorems of comparison of solutions of ordinary differential equations as well as qualitative properties of the family of solutions in the non-uniqueness case. For instance, he proved that, for the point set  $M$  consisting of solutions, starting from a fixed point  $O$ , of an ordinary differential system, any point  $P$  of the boundary set  $\partial M$  of  $M$  can be connected with  $O$  by an integral curve lying entirely on  $\partial M$ . Through his scientific life of many years, he constantly devoted his effort to the refinement of the basic theory of ordinary differential equations. It is to be noted that some of the refinement was recently applied successfully to automatic control theory.

An interesting kind of boundary value problem for an ordinary differential system was introduced and discussed by him with the aid of the fixed-point theorem in function spaces. He applied the method, by combining it with the comparison theorem, to a detailed research of the asymptotic behaviour of solutions of linear differential systems. The series of these researches are called "the Dini-Hukuhara type theorems" by the specialists in the U. S. A.

For non-linear analytic ordinary differential systems, Professor Hukuhara constantly stressed the importance of the use of the formal power series satisfying the system formally. He successfully made use of such formal solutions in a unified treatment of regular and irregular singular points of linear differential systems and in expansions of ordinary linear differential equations containing a large parameter.

From the very beginning of his scientific career, Professor Hukuhara was much interested in the global theory of solutions of ordinary

algebraic differential equations inaugurated by P. Painlevé. After many years of preliminary investigations, he could give a complete reduction at least for the case of first order equations. The results include the famous research of J. Malmquist as a special case, and he was awarded the Academy Prize for these researches. A detailed exposition of these results was published in book form jointly with his former pupils, Professor T. Kimura and Madam T. Matuda.

Professor Hukuhara was also interested in integral equations, and, with the aim of generalizing the Riesz-Schauder theory, he contributed interesting papers on a topology-free treatment of the endomorphism in vector spaces and on completely continuous operators in linear topological spaces. These have recently been further developed to a mapping theory in lattices.

Professor Hukuhara is the author of several books and monographs which summarize his extensive contributions to Functional Equations. He has attracted and stimulated many younger mathematicians, who have found in his ideas a fertile starting point for continuous further development. He always has been a devoted, unselfish friend to his colleagues and junior scholars. His colleagues, friends and students feel a great admiration for, and sincere gratitude to him.

K. Yosida