

Kawakami Masamitsu (1912.1.1—1996.5.15)

"Contribution to research and education on electronic circuits,
and to reinforcement of graduate school system"

1 . Biography

1935 graduated from Tokyo Institute of Technology,
joined Tokyo Electric Company (former of Toshiba Corporation)

1948~1972 Associate Professor, Professor, Dean of Faculty of Tokyo
Inst. of Tech.

1969 President of Institute of Electronics and Communication of Japan

1972 The Medal with Purple Ribbon

1973~1977 President of Tokyo Inst. of Tech.

1974 NHK Broadcast Cultural Award

1975~1979 Japan Science Council

1977 Professor of Yokohama National Univ.

1977~1983 President of Nagaoka Univ. of Technology.

1982 Commendation for Distinguished Cultural Service

1984 Order of the Rising Sun, Gold and Silver Star



2. Contribution to Research and Education on Electronic Circuits

2. 1 Systematic Treatment of Active Circuits (Introduction of Four Terminal Matrices)

Kawakami Masamitsu achieved many research results on filter theory and active circuits including vacuum tubes and transistors. His book "Theory of Linear Circuits Containing Vacuum Tubes" published in 1949 showed uniqueness of his research works. Before this Kawakami's work, circuits containing vacuum tubes had individually been analyzed and designed using Kirchhoff's Law. Thus, each method had no common skills and treatment of complicated circuits was quite time consuming. Introducing the concept of four terminal matrices and representing the characteristics of vacuum tubes with the matrices, Kawakami made it possible to systematically treat electronic circuits. After the invention of transistors in 1947, research on electronic circuits using transistors became quite popular. The matrix method which Kawakami proposed was quite useful and contributed to establish systematic synthesis of electronic circuits.

In addition to research on vacuum tubes and transistors, Kawakami expanded his work to negative impedance converters and gyrators which were used for active filters. He showed basic characteristics of these active elements could be expressed by simple matrices and introduced the concept of active fundamental circuits in order to systematically treat the active elements. The active fundamental circuits were recognized as a quit effective tool to construct electrical circuits and to realize active filters. This research result was published in foreign journals to create a great response and referred in many foreign books.

2. 2 Creation of new technical term DENSHIKAIRO (Electronic Circuit)

Kawakami used the technical term 'DENSHIKAIRO' (electronic circuit) in his books DENSHIKAIRO I~V¹⁾. The DENSHIKAIRO corresponds to the term 'electric circuit' of electrical field and is a creation of Kawakami. Now it is a standard term. 'DENSHIKAIRO I~V' were published from 1953 to 1958, when electronic industries in Japan were just began to build up. The books contain systematic synthesis theory and many design formulae of circuits using vacuum tubes and transistors based on the methods shown in above 2.1 and became most popular books for engineers and students. This leads to the development of electronics which supports current prosperities of Japan. 'DENSHIKAIRO I~V' were selected as the best book award by IECE.

3. Contribution to Higher Education

3.1 Contribution to reinforcement of graduate school

Kawakami Masamitsu stayed in U.S.A. as a visiting scholar and recognized that graduate school education had been supporting high level research in U.S.A. After returning to Japan, he made a proposal to the Ministry of Education that higher education in Japan should give priority to the graduate school. Few years later, the Ministry of Education started reinforcement strategies and each university responded to the strategies resulting in the reform of graduate school. Kawakami must have a keen insight to find out this more than 30 years ago.

Kawakami reformed the structure of Tokyo Inst. of Tech to enhance the graduate school. As the president of Tokyo Inst. of Tech, he promoted the foundation of new campus in Nagatsuda area where he set up new graduate schools. Three research institutes and many schools moved from Ookayama to the Nagatsuda campus to form so-called 'independent graduate school' which has no undergraduate courses. Thus the student number of under graduate became nearly equal to that of the graduate course.

3.2 Contribution to establishment of Nagaoka University of Technology

Kawakami, as the chair, joined the arrangement committee for establishing new universities of technology, Nagaoka University of Technology and Toyohashi University of Technology. After finishing his presidency at Tokyo Inst. of Tech. he assumed the president of Nagaoka University of Technology and established unique education system there.

In order to educate students having creative and practical research abilities, Kawakami adapted trimester system and practical training at graduate school. The fourth grade students, who will study at graduate schools, are trained at a company to make research bases of the students. This long term training at a company is the first trial in Japan resulted in a high educational effect.

4. Remarks

He authored several books concerning the revolution of university and development of creative ability of researchers. He served as a member or a chair of several committees of the Ministry of Post, the Ministry of Education, NTT, NHK, etc. Kawakami is honored for his contribution to not only scientific but also cultural activities shown above.

(2021-12 FUJII Nobuo)

1) Kyouritsu Publishing Co. 1953--1958