DIGITAL CONTROL OF ELECTRICAL MACHINES

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SUMMARY

The requirement for control performance of electrical machines has been getting higher and higher. During last two decades the technics of semiconductor power converters have been extremely developed, and they have been successfully applied to the control of electrical machines. Recently, digital control of electrical machines has been introduced in order to achieve higher control performance. Especially, the present rapid development of microprocessor leads to the possibility of entirely digital scheme of control by means of stored program method. A control system using entirely digital scheme is free from drift and offset error which are inherent in analog circuits. In addition, the use of microprocessors inproves the flexibility of the design of the control system, and probably minimizes the cost.

In the present lecture recent state of art of variable speed drives is, first,reviewed. The technics of variable speed drives is the most important application area of electrical machine control. By the use of microprocessors, the control systems of variable speed drives have been getting into a new phase.

Second, the fundumental concept on digital control systems
of electrical machines is shown. The basic construction of
a computer-controlled system is presented, and the role of
microprocessor in the control system is discussed.

Thirdly, the state of art of microprocessor is reviewed. The
microprocessor technology has been rapidly developed. The past
and the present state of art are briefly explained and the
future forecast is also discussed.

Fourthly, microprocessor-based speed control systems of motors
are shown. The advantages of microprocessor control systems
over the conventional systems are discussed, and various types
of control strategy are also presented. The accuracy of speed
control and the dynamic performance of the control system are
discussed in connection with the capability of microprocessors.

Finally, practical examples of microprocessor-based control
system of electrical macnines are presented. Microprocessor-
based speed control systems of AC drives are shown as the
most promising systems.