

INTELLIGENT EMBEDDED CONTROLLER FOR AN ELECTRIC DISCHARGE MACHINE –PRELIMINARY STUDY

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Electric Discharge Machining is manually dependent process since many machining parameters are determined by experienced operators in practice. With the trend of automation and the need for parts with intricate shapes in modern industry, an adaptive control system, which can regulate machining conditions automatically during the machining process has become more and more important in the current use of Electric Discharge Machines (EDM).

This paper discusses the embedded controller designed for a classical EDM. Generally, average gap voltage is used in the servo controller of a classical Electric Discharge Machine to control the spark gap. An embedded controller with some additional integrated circuit is used for sensing the gap voltage and to generate the required pulse width modulation signals to drive the DC motor.

Fuzzy control has been used in designing the adaptive servo control system controlling the average gap voltage during machining. It is an on-line expert system, which realizes adaptive control strategy taken by a skilled operator. The operator's skill, which is difficult to describe in simple mathematical equations, is represented by a set of fuzzy production rules. The fuzzy controller determines necessary changes in the machining settings to keep it stable and at optimum machining conditions. This type of controller may provide a solution to unattended operation for EDM machines in the future.

Newly designed embedded system replaces the hardware of the malfunctioning EDM machine at the department of production engineering. All experiments will be carried out with the existing machine once the hardware setup is ready.

