The Study of Servo Control of the Intelligent EDM

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ABSTRACT

In this study, the computerized numerical controller (CNC) of the electric d ischarge machine(EDM) of Mechanical Industry Research Laboratory of Industrial Technology Research Institute(ITRI) is added an auxiliary intelligent gapcontroller and an inserted intelligent EDM''''s servo controller.The auxiliary intelligent gap controller can detect the large amplitude of the electrode vibration and then switch the control parameter to a small one in order to maintain the system stability. The variable structure system(VSS) controller can force the electrode quickly reaching the appropriate position according to the feedback gap voltage. The controller can also determine the occurrenceof the forcing jump of the electrode after detecting the movement of the electrode.The inserted intelligent EDM''''s servo controller can achieve adaptive regulation of reference gap voltage and jump frequency during deep-sinking roughing process, and the auto switch of the optimal generator parameters during orbiting finishing process. The generator parameters can be obtained viasearching the optimal metal removal rate (MRR) under the constraints of surface roughness and electrode wear percent.The reference voltage been regulated or the jump frequency been changed is decided by the arcing discharge remaining in the discharge gap.The controllers will be individually installed ona practical EDM system in order to verify the system improvement.

Keywords : 電腦數值控制 ; 最佳化參數 ; 排渣控制 ; 間隙控制

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