

The Design of high frequency for discharge machining process

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ABSTRACT

In this research, the analysis of the frequency spectrum analysis will be done in order to realize the characteristics of the spectrum on the certain high frequency. The arc discharge during the die electric discharge machining process and the engaging process of the deephole discharge machining process. The design procedure and the implementation of the frequency monitor will be presented according to the results of the spectrum characteristics. The monitor can discriminate the pulse and generate an arc notice signal to the CNC according to the compare results of the frequency spectrum. The monitor will be verified the improvement on the erosion process on the die electric discharge process and the deep-hole electric discharge process.

Keywords : EDM ; CNC ; Specturm Analy

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REFERENCES

- [1] Rajurkar , K.P. and Pandit , S. M. , " Pulse Current Signal as a Sensor for On-line Computer Control of EDM , " 11th NAMRC , May 1983 , pp379-385.
- [2] Wang , W , " A New EDM Adaptive Control Plan using Self-Tuning Control Algorithm , " Proceedings of Manufacturing International '88 ASME , 1988 , pp.227-233.
- [3] Dauw , D.F. and Snoeys , R. , " Advanced Pulse Discriminating System for EDM Process Analysis and Control , " Annals of the CIRP Vol.32/2/1983 , pp.531-549.
- [4] Rajurkar , K. P. and Wang , W. M. , " A New Model Reference Adaptive Control of EDM , " Annals of the CIRP Vol.38/1 , 1989 , pp.183-186.
- [5] 張義芳、楊信生 " 放電加工智慧型間隙控制器設計 , " 86年第十四屆中國機械工程全國學術研討會 , pp.154-161。
- [6] Snoeys , R. , Dauw , D.F. , and Kruth , J.P. , " Survey of Adaptive Control in Electro Discharge Machining , " Journal of Manufacturing Systems , Vol.2/2 , 1983 , pp.147-164.

- [7] Snoeys , R. , Staelens , F. , and , Dauw , D.F. " Adaptive Control Optimization as Basis for Intelligent EDM Die-sinking Machines , " Proceedings of the Winter Annual Meeting of ASME , Vol.22 , 1986 , pp.63-78.
- [8] Staelens , F. , Snoeys , R. and Kruth , J. P. , " A Machining Strategy and Adaptive Control Optimization for Planetary EDM , " Proceedings of the Winter ASME Conference , PED-Vol.34 , 1988 , pp.213-227.
- [9] Staelens , F. and Kruth , J. P. , " A Computer Integrated Machining Strategy for Planetary EDM , " Annals of the CIRP , Vol.38/1 , 1989 , pp.187-190.
- [10] Wang , W. M. and Rajurkar , K. P. , " Modeling and Adaptive Control of EDM Systems , " Journal of Manufacturing Systems Vol. 11 , No. 5 , 1992 , pp.334-345.
- [11] 張義芳 , 石興銓 , 粘永峰 , " 放電加工之放電參數模糊控制 , " 88年第十六屆中國機械工程全國學術研討會 , pp.350-357。
- [12] Chang , Yih-Fang , " The Monitoring and Control of Discharge Efficiency on EDM , " The 6th International Automation Conference in Taiwan , 2000 , pp.361-366 , NSC 88-2212-E-212-010.