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# A Comparative Investigation on Temperature Distribution in Electric Discharge Machining Process through Analytical, Numerical and Experimental Methods

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## Abstract

Electric discharge machining (EDM) is a widely-used non-traditional machining process in manufacturing of complicated structures based on localized thermal loads. Because of numerous difficulties in measuring temperature, no adequate knowledge on temperature distribution of workpiece, tool and plasma channel is available. On one hand, a large number of dispersedly-published papers have been reported so far to model the temperature distribution whether analytically or numerically. On the other hand, an enormous amount of experimental attempt has been put into measuring the temperature by directly-measuring methods. In this study, a comprehensive review of analytical, numerical and experimental investigations on temperature prediction has been provided to organize different methods to integrate them as useful information for elucidating the differences between approaches and identifying their proximities to the real temperature distribution. This review also prepares a classification of the different methods of investigating temperature and provides an overview of some of the recent advances in this area to help researchers on selecting appropriate approaches among analytical, numerical and experimental techniques depends on applications and the availabilities of those techniques. The assumptions, limitations and features of different methods are described. Finally, the paper shows some required enhancements for EDM process to improve the total accuracy of temperature prediction as well as recommendations for future studies.

**Keywords:** Electrical Discharge Machining; Temperature distribution; EDM characteristic; Analytical method; Numerical method; Experimental method

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