International Journal of Engineering & Technology, 7 (2.29) (2018) 41-42

SPC

International Journal of Engineering & Technology

Website: www.sciencepubco.com/index.php/IJET

Research paper



A brief review of grey fuzzy logic technique research progression from 2010 to 2016

Suhaila Yacob[1*],Mohd Amran Md Ali[2] , Qumrul Ahsan[3] , Nurulhuda Arifin[4] , Rafidah Ali[5]

[1,4,5] Department of Quality Engineering,Faculty of Quality Engineering and University Kuala Lumpur Malaysian Institute of Industrial Technology (MITEC) Persiaran Sinaran Ilmu, Bandar Seri Alam,81750 Johor Bharu. Johor. Malaysia
[2,3] Department of Manufacturing ,Faculty of Manufacturing and Universiti Teknikal Malaysia Melaka Hang Tuah Jaya 76100 Durian Tunggal ,Melaka,Malaysia
**Corresponding author E-mail: suhailay@unikl.edu.my*

Abstract

Grey fuzzy logic method is a new artificial intelligent method that can make significant improvement in the performance characteristics of the process. In the present study an attempt has been made to provide a brief understanding of the advancement of the Grey Fuzzy Logic from 2010 to 2016. The first half of this paper presents the publication trend of Grey Fuzzy Logic. The remaining of this paper briefly explains the contribution of the individual publication related to Grey Fuzzy Logic. It is believed that this paper will greatly benefit the reader who needs a bird-eyes view of the Grey Fuzzy Logic 's publications trend.

Keywords: *Grey fuzzy logic; welding parameter; multiple optimizations.*

1. Introduction

Welding is one of the important process and widely used in manufacturing processes especially in automation and aerospace industries. Numerous researchers have agreed that the welding parameters can affect the weld characteristics. It is proved that it is important to understand how the welding parameters reactions affect the weld characteristic. Therefore, it is supposed to be sharp and focuses to observe the change of weld characteristics when the condition of the welding variables increase or decrease.

Nowadays, grey fuzzy logic method have become popular because of its become famous due to its simplicity for optimize the process parameters. There is no single study related to optimize gas metal arc welding force arc welding parameters using grey fuzzy logic method. From year 2010 to 2016, only one welding researcher (E.R. Dhas and J. Satheesh 2012) had explored on application of grey fuzzy method in submerged arc welding process in 2012. The best knowledge of welding thick plate AA6061 using gas metal arc welding EWM force arc is not described. According to the fact, no present work investigates 6mm of AA6061 using optimize gas metal arc welding force arc welding.

2. Brief review of grey fuzzy logic method

Revolution has been established from conventional optimization method to intelligent optimization method for provide better prediction of welding parameters. As highlighted by E.R. Dhas and J. Satheesh 2012, ,it is become one of requirement to select select the most appropriate weld parameter settings in order to produce high quality product,low cost and improve weld efficiency. Recently; grey fuzzy logic method is became famous among current researchers based on several reasons such as below:

- To solve correlated multiple response optimization problems (E.R. Dhas and J. Satheesh 2012)
- To overcome issue related traditional Taguchi approach is insufficient.
- Grey fuzzy logic method was successfully proved capable to optimize multiple objectives of complicated problems in machining parameter optimization
- Grey fuzzy logic method produced good agreement between the predicted and experimental output factor results.

The grey fuzzy logic method converts the complex multiple objectives into a single grey-fuzzy reasoning grade. E.R.Dhas and J. Satheesh 2012 have explained a detailed methodology of the grey fuzzy logic. The procedure of grey fuzzy logic method started with the application of Taguchi method, grey relational analysis followed by fuzzy logic, ANOVA and confirmation test (E.R.Dhas and J. Satheesh 2012). Grey fuzzy logic method process shown in Figure 1.

Copyright © 2018 Authors. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

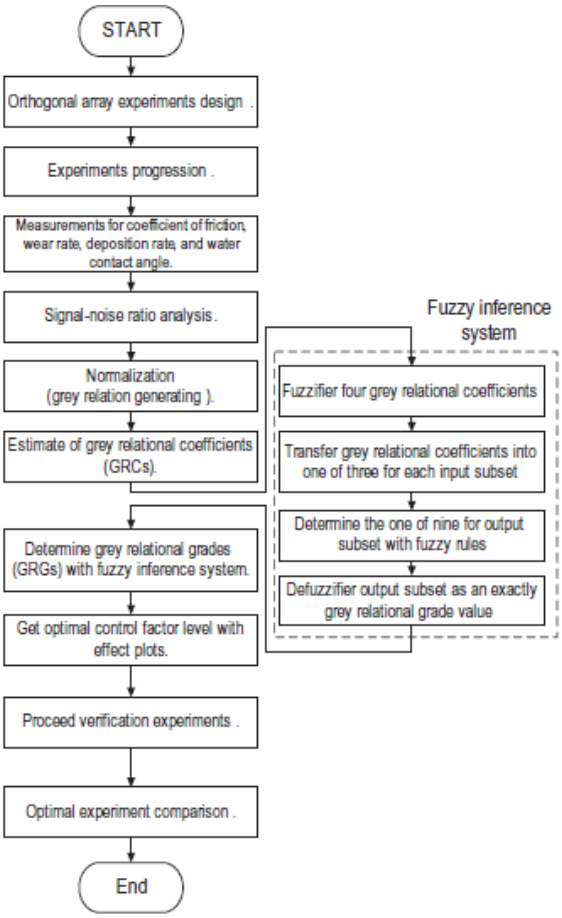


Fig. 1: Grey fuzzy logic method process (Y.S. Yang and W Huang,2012)

There are ten main components in grey fuzzy logic such as orthogonal array, grey relational coefficient, fuzzy logic model, membership function, fuzzy rule, fuzzy viewer, table of grey-fuzzy reasoning grade and their rank , the graph of the response graph for each level of parameters, ANOVA and confirmation test. In grey fuzzy logic methodology, the results were analyzed using grey relational analysis and analysis of variance (ANOVA). The analysis using ANOVA for indicates the percentage of contribution and significant parameter. Fuzzy grey relational analysis has been used to optimize welding parameters. According to E.R.Dhas and J. Satheesh 2012, optimum levels of parameters are identified based on grey-fuzzy reasoning grade. On the other hand, grey fuzzy logic method is mostly used in optimization of machining parameters for produced high quality output.It is used in various applications such as drilling (A. Krishnamoorthy et al.2012), turning (S.Tamang and M. Chandrasekaran,2014),CNC (I. Hanafi et al.2012, H.Vasudevana et al.2014) and milling (N. Tamiloli et al.2016).

3. Conclusion

In this paper, the development of grey fuzzy logic method has been reviewed from 2010 to 2016. Grey fuzzy logic method is still considered as a new hybrid intelligent method. It is growth is remarkable during this six year.

4. References

1. Karaoğlu S, Secgin A. Sensitivity analysis of submerged arc welding process parameters. journal of materials processing technology. 2008;202(1-3):500-7.
2. Dhas ERJ, Satheesh M. Multiple objective optimization of submerged arc welding process parameters using grey based fuzzy logic. Advances in Production Engineering & Management. 2012;7(1):5.
3. Yang Y-S, Huang W. A grey-fuzzy Taguchi approach for optimizing multi-objective properties of zirconium-containing diamond-like carbon coatings. Expert Systems with Applications. 2012;39(1):743-50.
4. Krishnamoorthy A, Boopathy SR, Palanikumar K, Davim JP. Application of grey fuzzy logic for the optimization of drilling parameters for CFRP composites with multiple performance characteristics. Measurement. 2012;45(5):1286-96.
5. Tamang S, Chandrasekaran M, editors. Application of grey fuzzy logic for simultaneous optimization of surface roughness and metal removal rate in turning Al-SiCp metal matrix composites. 5th International & 26th All India Manufacturing Technology, Design and Research Conference (AIMTDR 2014); 2014.
6. Hanafi I, Khamlichi A, Cabrera FM, Fuentes D, Jabbouri A. Grey-fuzzy optimisation model for multi performance in CNC turning processes. International Journal of Computational Systems Engineering. 2012;1(2):108-17.
7. Tamiloli N, Venkatesan J, Ramnath BV. A grey-fuzzy modeling for evaluating surface roughness and material removal rate of coated end milling insert. Measurement. 2016;84:68-82.