Artificial Intelligent Methodology for Liquid Propellant Engine Design Optimization

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Abstract : This paper represents the methodology based on Artificial Intelligent (AI) applied to Liquid Propellant Engine (LPE) optimization. The AI methodology utilized from Adaptive neural Fuzzy Inference System (ANFIS). In this methodology, the optimum objective function means to achieve maximum performance (specific impulse). The independent design variables in ANFIS modeling are combustion chamber pressure and temperature and oxidizer to fuel ratio and output of this modeling are specific impulse that can be applied with other objective functions in LPE design optimization. To this end, the LPE's parameter has been modeled in ANFIS methodology based on generating fuzzy inference system structure by using grid partitioning, subtractive clustering and Fuzzy C-Means (FCM) clustering for both inferences (Mamdani and Sugeno) and various types of membership functions. The final comparing optimization results shown accuracy and processing run time of the Gaussian ANFIS Methodology between all methods.

Keywords : ANFIS methodology, artificial intelligent, liquid propellant engine, optimization
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