Optimal Gating System Design of Steel Casting by Fruit Fly Optimization Algorithm Based on Casting Simulation Technology

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Abstract

Casting simulation technology is an effective method to provide the predicted information on defects such as shrinkage, gas entrapment, cold shut, misrun and inclusions. To extend the analysis of casting simulation technology, a new optimal method for gating system design by fruit fly optimization algorithm (FOA) is proposed in this paper. First, according to the filling principles of steel casting, the gating system geometry mathematical model, which includes objective function and constraint conditions, is established. Second, in order to obtain optimal solution, fruit fly optimization algorithm is introduced to solve the above model. Finally, numerical simulation software is used to verify the validity of the proposed optimal method. Taking an upper center plate casting as an example, the results indicate that the proposed optimal method could provide practical and useful suggestions for the designer to obtain higher-quality and lower-resource-cost designs in the gating system design process.

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