Abstract

Manufacturing system has been evolved over the years to accommodate major design variations. To respond to these high frequency variations and to stay competitive, there is a need of having such type of manufacturing system that could cope with market trends and design changes efficiently. Product’s design and its manufacturing capabilities are closely related, thus the manufacturing system should be customized to cater all the design changes with suitable manufacturing capabilities. Reconfigurable Manufacturing system has been recommended for the turbulent market conditions because of its flexible and changeable nature. This research work is based on the co-generated model. Based on different tool approach directions and machine’s accessibility, the machine’s kinematic configurations are defined against each generated process plan. A new approach is proposed that ensures the optimal selection of process plan considering different process planning parameters such as tool approach directions, tool change, set-up change and part rotation. A multi-objective genetic algorithm has been applied on co-evolution model. The proposed approach is generic and can be applied on different features of same part family. Considering the relevant change drivers the degree of reconfigurability in any case of application can be achieved through proposed algorithm. A case study has been presented to illustrate the application of proposed model based on the technological constraints.

Keywords: Reconfigurable manufacturing system (RMS), Multi objective genetic algorithm (MOGA), alternative process plans (APPs).