

Research on reliability modeling technology for FMS based on task

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Abstract

As a high flexible and efficient manufacturing system suitable for small-batch and multi-type production, flexible manufacturing system (FMS) reliability plays a very important role in customer requirements. Since FMS is a complicated multitask system with uncertain structure, it is difficult to analyze and evaluate its reliability by traditional reliability modeling method. Aiming to solve the issue, a new method of reliability modeling based on task for FMS is proposed in this paper. Firstly, the definitions of FMS reliability and task reliability are proposed; Secondly, generalized stochastic Petri nets (GSPN), transfer function (TF) and moment generating function (MGF) are introduced; Thirdly, with certain assumptions, FMS reliability model based on task is built by using GSPN; Finally, FMS80 is taking as an example, and its task reliability degree calculating models are established to show the correctness and feasibility of this method.

Keywords: FMS, Reliability Modeling, Task Reliability, GSPN, MGF