A Method for the Design of Petri Net Controller Enforcing General Linear Constraints

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Abstract

The problem of constructing a Petri net feedback controller, which enforces linear inequality constraints involving the marking vector and the Parikh vector on a discrete event system (DES) modeled by Petri nets (PN), is discussed in this paper. A novel method for design of controller enforcing the constraints is presented. First the constraints involving the marking and Parikh vectors are transformed into the constraints involving Parikh vector only using Petri net state equality, and then the controller is constructed based on the viewpoint that a place can be seen as a linear inequality constraint on the Parikh vector. The method is proved to be simpler and more efficient than that presented by Iordache and Moody through an applied instance that was also used by Moody et al., and holds remarkable advantage especially for large systems.

摘要

针对基于Petri网离散事件系统关于标识向量和Parikh向量的不等式约束反馈控制器设计问题,提出一种新的控制器设计方法.该方法首先利用Petri网的状态方程把关于标识向量和Parikh向量的不等式约束转变成关于Parikh向量的不等式约束,然后基于Petri网库所是关于Parikh向量的不等式约束的观点构造控制器.最后将该方法与Iordache和Moody提出的方法作比较,实验结果显示该方法更简单、有效.

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