



MODELING AND OPTIMAL SUPERVISION OF MULTI-SENSORS AND MULTI-STATES DISCRETE-EVENT SYSTEMS WITH STRUCTURED LANGUAGES

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Abstract- In a discrete-event system, more than one sensor will create more than one event. Several events may happen at the same time parallelly. Events in different parallel branches are irrelevant and it will lead states explosions if mixing them together and enumerating all possible arrangements. A system with parallel sequences has multi-threads and can be dealt with as a whole. In this paper, after analyzing the process of discrete-event systems, the new model is established as a 5-tuple set, which is called a generator with multi-threads. The new generator will generate structured languages which are in accordance with the sequences of the process. The controllability of the structured languages is defined and the theorem about the existence of the supervisor for given languages is presented and proved. For given specifications, the method to solve the supervisor is presented. With the new model, the states of the total system will not explode when two or more systems synchronizing. From two examples shown in Section VI, the new model and supervisor theory for multi-sensors and multi-states discrete-event system are more convenient and natural than that of the traditional theories.

Index terms: Discrete-event system, multi-sensors and multi-states, structured languages, supervisory control.