Real-time reconfiguration of distributed control system based on hard Petri nets

V. Ababii, V. Sudacevschi, M. Podubnii, I. Cojuhari

Abstract

This paper presents the design of a distributed control system based on Hardware Petri nets with real time reconfigurable architecture. The system consists of a main computer unit and a lot of homogeneous reconfigurable controllers connected to a Wireless Local Area Network (WLAN). The control algorithm is implemented into an Field Programmable Gate Array (FPGA) circuit which is configured via a microcontroller. Specialized design tools on a computer unit are responsible for the following steps: Petri net model elaboration, its analysis and validation, translation of the Petri net model into a hardware description, generation of the FPGA configuration bitstream and its transmission to reconfigurable controllers. The configured FPGA device represents a control unit, the working algorithm of which can be changed each time when it is necessary.