

Abstract

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To support the application of real-time Multi-Agent Control Systems (MACS) for mechatronic systems, a combination between the MACS design approach and OROCOS framework has been implemented: the OROCOS-based Implementation Framework for MACS (OROMACS). This paper presents our research results to make the OROMACS framework be easily applicable to develop realtime safe-guarded controller-agents and to maximize the reusability of safe-guarded MACS designs for various types of mechatronic systems. The approach that we advocate is a combination between OROMACS framework and pattern-based design method. Eleven control system design patterns are formed in which the Safe-Guarded Agent, one of the core design patterns, aims at providing a generic and flexible safe-guarded control solution for mechatronic systems. The design patterns are well organized into two reusable generalized safe-guarded control solutions, one for simple mechatronic systems and one for complex mechatronic systems.