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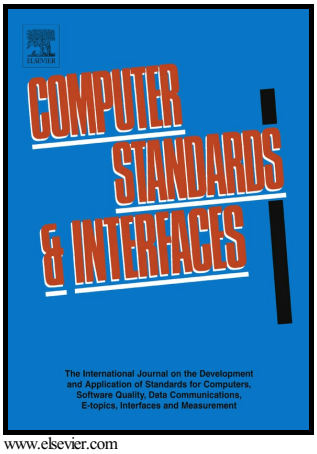

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Distributed Control System For Ship Engines Using Dual Fieldbus

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Abstract

This paper describes a distributed control system (DCS) for ship engines using a dual fieldbus. Communication among DCS entities is provided by considering the redundancy between Modbus and the controller area network (CAN) bus. The dual fieldbus consists of Modbus and an alternative CAN bus. Owing to its short time frame, CAN networks have the advantage of a short time latency. Moreover, Modbus is a simple protocol and is powerful in its support of many types of real-time industrial applications. By considering the benefits of both Modbus and CAN bus, a DCS based on a dual fieldbus for monitoring and controlling the condition of a ship engine has been proposed. In the proposed scheme, Modbus has been used as a primary communication link for engine system. If link errors arise with Modbus, the system automatically switches to CAN in a reliable way. The performance of the proposed DCS has been tested and evaluated by a real implementation in a testbed. The experimental results show that the proposed DCS satisfies the redundancy time required by the International Association of Classification Societies.

Keywords: Distributed Control System, Ship Engine System, Dual Fieldbus, Modbus, Controller Area Network (CAN)

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