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AUTOMATIC CONTROL and COMPUTER SCIENCE Section

CONTENTS

Modelling of An Electromagnetic Valve Actuator

Constatin Florin Căruntu, Mihaela Hanako Matcovski, Andreea Elena Bălau, Daniel Ion Pătraşcu, Corneliu Lazăr and Octavian Păstrăvanu

Full text

During the last few years automotive actuators have become mechatronic systems in which mechanical components coexist with electronics and computing devices and because pressure control valves are used as actuators in many control applications for automotive systems, a proper dynamic model is necessary. Starting from the modelling of a single stage pressure reducing valve found in literature, in this paper, the concept of modelling a real three land three way solenoid valve actuator for the clutch system in the automatic transmission is presented. Two simulators for an input-output model and a state-space model were developed and these were validated with data provided from experiments with the real valve actuator on a test bench.

Key words: control valve, pressure reducing valve modelling.

2000 Mathematics Subject Classification: 93A30, 00A72.

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OSEK Based Embedded Control System Using Schedule Feasibilty Selftesting

Cătălin Brăescu and Lavinia Ferariu

Full text

The paper presents an embedded control application implemented in C for S12X microcontroller. As OSEK/VDX real time operating system is adopted, the solution results portable, safe and predictable. The control law is formulated for different sampling frequencies. The higher acquisition frequency is treated as the default one. It is chosen to support high performance for the automatic system and a rapid detection of disturbances acting on the plant inputs and/or outputs. The feasibility of the schedule is verified during on-line execution, by calculating the execution times for all involved processes. If real time constraints are violated due to unexpected situations, the total utilisation is reduced switching to lower sampling frequency. This adaptive mechanism preserves the consistency of the control algorithm even in overloading conditions.

Key words: real time systems, embedded systems, control algorithm, scheduling.

2000 Mathematics Subject Classification 93C83

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Modern Microcontrollers as Virtual Devices for Old Microprocessor Systems

Vlad Vasiliu and Aleodor Daniel Ioan

Full text

The main idea behind this work is to find a way to simplify the microprocessor based systems. Our solution is to replace all input/output chips (like serial, parallel, timers, etc.) with a single microcontroller that can have more interconnectivity capabilities. We can imagine a new kind of virtual I/O devices implemented in microcontroller by software. This combination of modern microcontroller technology with old standard microprocessor systems can be effective and powerful for many low cost industrial control systems. The proposed configuration can offer a new perspective over the actual research in microprocessor systems which are oriented to industrial control applications.

Key words: Microcontroller, embedded systems, multi I/O controller, interrupts, virtual devices.

2000 Mathematics Subject Classification: 68M01, 94C12.

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A Finite State Machine Model Used in Embedded Systems Software Development

Andrei Stan, Nicolae Botezatu, Lucian Panduru and Robert Gabriel Lupu

Full text

Finite state machines are among the most used building blocks in the embedded systems design for creating quality firmware. The custom implementation of finite state machines consumes time and is prone to error. A better approach is to design an abstract engine (kernel or core) that runs a finite state machine based on an appropriate description. By using such an engine, an embedded designer would have only to specify the actions, checks and transitions in terms of simple functions and tables and let the engine to take care of all the housekeeping work needed to run the finite state machine.

Key words: embedded systems, finite state machines, microcontroller.

2000 Mathematics Subject Classification: 68N19, 68P99.

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Some Considerations on the Synthesis of Sequential Logic Systems Using Set-Reset Flip-Flops

Alexandru Valachi, Bogdan Aignătoaiei, Mihai Timiş and Adrian Baban

Full text

The synthesis and implementation of Finite Automata (FA) can be accomplished using various flip-flops (R-S, J-K, D, T). Usually, for SET-RESET (R-S) flip-flops, in technical literature, it is considered the case of circuits for which the data inputs can not be activated simultaneously (Rn*Sn = 0) [2]. In this paper we will take in consideration all types of R-S circuits (SET-Dominant, RESET-Dominant, unsimultaneously activation of R-S inputs).

Key words: Finite Automata, Flip-Flop, Moore Machine, Mealy Machine.

2000 Mathematics Subject Classification: 94C10.

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