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Model checking method for Embedded Software using RTOS

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The quality assurance of embedded software has been becoming a challenge, because the size of embedded software has been fast expanding. So model checking technique is tried to apply software development. The model checking is attractive, so that certifies completeness of verification in closed finite state space, and is an automatic verification technique. But that has an issue, which is called "state explosion problem". Recently, this problem is gradually solved with evolution of computer, but that is not enough to treat the state transition model having the volume of information of source code. General method of the embedded software model checking does not exist now. Therefore, many case study of embedded software model checking is first needed.

In these years, embedded software using RTOS is incrementally and using RTOS is becoming generally. So, on the software model checking, considering RTOS's scheduling policy can't escape now.

There are two purpose of this research. One is "approaching a method of design model checking for embedded software using RTOS". The other is "making a case study of model checking of real embedded software product."

The result of this research is three. First result is "Offering a method of design model checking for embedded software using RTOS specified with μITRON". Second result is "Making a PROMELA inline function library for verifying the design of using mailbox system call specified with μITRON ". Last result is "Making a case study of embedded software model checking."

The outline of this thesis is described. The first section is describing abstraction of this research. Second section describes relationship technique with this research. Third section approaches a method of design model checking for embedded software using RTOS specified with μITRON. Fourth section is described that how to make PROMELA mailbox library and how to verify the library functions. What kind of case study treated Section5 is being written.