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主 論 文 の 要 旨

論文題目 A Study on Dependability Assurance in System Modeling
(システムモデリングにおける信頼性保証の研究)

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論 文 内 容 の 要 旨

Models and architectures in software engineering are simplified representations that focus on certain properties of design objects. The description, visualization, and documentation for information systems can be simplified by modeling. Through modeling, abstraction degree of the system design will be increased, and verification at an early stage of system development becomes possible.

In this paper, we analyze and study the problem of dependability assurance in system modeling. We analyze the deficiencies of existing methods, and propose new methods to improve these deficiencies. In existing methods, the architecture diagram describing target system is different from assurance diagram, this complicates development and management. We propose an Intra Model Security Assurance method that integrates system architecture diagram and assurance case diagram to improve the efficiency of development and management. Besides, we propose a visualized assurance approach for Enterprise Architecture, which includes Technology Layer assurance, Application Layer assurance, and Business Layer assurance.

Another problem in existing methods is that the automaticity of dependability evidence for complex systems is inefficient. In a system with complex process interactions, the dependability of interactions among the system processes is often difficult to describe in existing methods, because this would increase the complexity of the description. We propose a composite safety assurance method, and use model checking to assure the dependability of interactions. Moreover, we provide a formalized procedure for dependability assurance, which boosts the confidence of system dependability.