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构件组装及其形式化推导研究

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Abstract

Component based software engineering (CBSE) is one of the most effective solutions to improve software development quality and productivity. Component composition and compositional reasoning are the core technologies and frontier research areas in CBSE. Based on the characteristics of software components and inspired by process construction methods in process algebra, in this paper, six component composition mechanisms are proposed to integrate software components simply and conveniently. And it is argued to compose interfaces at the same time of component composition, consequently to generate more powerful and more abstract interfaces to support integration of coarse-grained components and raise the abstract level of component composition. Moreover, based on the Wright's research on formal specification of software architecture, compositional reasoning algorithms about the behaviors of composite component as well as the protocols of composite interfaces are developed in this paper, which establish a foundation to analyze, validate, simulate composite systems.

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摘要

基于构件的软件工程(component based software engineering,简称CBSE)能够有效地提高软件开发的质量和效率.构件组装和组装推导(compositional reasoning)是CBSE的关键技术.基于软件构件的特点,借鉴进程代数中进程构造的方法,提出6种构件组装机制,能够灵活、简便地集成软件构件,并主张在构件组装的同时进行接口组装,通过生成功能更强、抽象级别更高的复合接口,提高构件组装的抽象级别和粒度.同时,基于Wright的形式化规约软件体系结构的研究,给出了复合构件和复合接口的组装推导算法,为系统行为的形式化分析、验证和仿真奠定了基础.

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