

# 一种控制软件体系结构复杂性的方法

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**摘 要:** SA 作为软件系统的高层抽象及后续开发、测试、维护等阶段工作的依据, 其复杂性对系统影响深远. 依据 CN 及 SA 理论特点, 提出了利用 CN 进行 SA 复杂性的度量及控制方法. 论文首先介绍了复杂网络及无向无权网络方法, 在此基础上, 提出了通过构件的度、构件的度分布、SA 簇系数、SA 平均路径长度、SA 模块度等度量属性进行 SA 复杂性的度量, 并给出了 SA 复杂性控制方法及具体度量属性值的参考范围. 最后, 对给出的 SA 复杂性的度量方法及控制方法进行了实例验证. 结果表明, 该方法在严格的形式化基础上, 可以较好地对所开发系统的 SA 复杂性的属性进行度量并进行控制, 为系统后续开发及维护等阶段的工作提供支持和参考.

**关键词:** 软件体系结构; 复杂网络; 复杂性; 控制

## A Control Method of Complexity for Software Architecture

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**Abstract:** As the basis of the high-level abstraction of the software system and subsequent development, testing and maintenance, the complexity of SA has a far-reaching impact on the system. According to the characteristics of CN and SA, the measurement and control method of SA complexity by using CN is proposed. This paper first introduces the method of complex networks and undirected and unweighted network, on this basis, the measurement of SA complexity is proposed through the degree of component, degree distribution of component, clustering efficient of SA, average path length of SA, modularity of SA, etc, then the complexity control method of SA and the reference range of the specific measurement attribute value are also given. Finally, the measurement method and control method of the SA complexity are verified by an example. The results shows that this method can metric and control the complexity of software system well based on strict formalization, and provides support and reference for subsequent development and maintenance of SA.

**Key words:** software architecture; complex networks; complexity; control

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