

数学与系统科学研究院学术报告

报告题目: Achieving high systems availability with mathematical models

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摘要:

High availability is being demanded for military as well as commercial applications such as e-commerce systems, financial systems, stock-trading systems, national and international telecommunication infrastructure (e.g., switches and routers) and several types of life-critical and safety-critical systems. Many techniques to achieve high availability from the hardware perspective are known. However, software remains the main bottleneck in achieving high availability. Despite many advances in formal methods, programming methodology, and testing, the software development process has not reached the stage to allow for the routine production of ultra-low defect software systems. Yet, complex software-based mission-critical systems are expected not to fail.

In this tutorial, we discuss availability aspects of large software-based systems. We classify faults into Bohrbugs, Mandelbugs and aging-related bugs, and then examine mitigation methods for the last two bug types. We then discuss quantitative approaches to availability assurance via stochastic availability models. We also discuss parameterization of these models.

报告人简介:

Kishor S. Trivedi holds the Hudson Chair in the Department of Electrical and Computer Engineering at Duke University, Durham, NC. He has been on the Duke faculty since 1975. He is the author of a well known text entitled, Probability and Statistics with Reliability, Queuing and Computer Science Applications, published by Prentice-Hall; a thoroughly revised second edition (including its Indian edition) of this book has been published by John Wiley. He has also published two other books entitled, Performance and Reliability Analysis of Computer Systems, published by Kluwer Academic Publishers and Queuing Networks and Markov Chains, John Wiley. He is an IEEE Fellow and a Golden Core Member of IEEE Computer Society. He has published over 420 articles and has supervised 41 Ph.D. dissertations. He is on the editorial boards of IEEE Transactions on dependable and secure computing, Journal of risk and reliability, international journal of performability engineering and international journal of quality and safety engineering.