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Towards Quantification of Survivability

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120 Butler - Carleton Hall

Abstract - Survivability is critical attribute of modern computer and communication systems. The assessment of survivability is mostly performed in a qualitative manner and thus cannot meet the need for more precise and solid evaluation of service loss or degradation in presence of failure/attack/disaster. This talk addresses the current research status of quantification of survivability. First we carefully define survivability and contrast it with traditional measures such as reliability, availability and performability. We then discuss probabilistic models for the quantification of survivability based on our chosen definition. Next, two case studies are presented to illustrate our approach. One case study is about the quantitative evaluation of several survivable architectures for the telephone access network. Hierarchical models are developed to derive various survivability measures. Numerical results are provided to show how a comprehensive understanding of the system behavior after failure can be achieved through such models. The second case study deals with the survivability quantification of communication networks.

Brief Bio - 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, originally 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 Queueing Networks and Markov Chains, published by John Wiley. He is a Fellow of the Institute of Electrical and Electronics Engineers. He is a Golden Core Member of IEEE Computer Society. He has published over 450 articles and has supervised 42 Ph.D. dissertations.