

Preface

We have been energetically proposed several reliability assessment methods for an open-source software in the last decade. Its measurement and management technologies for open-source software are essential to produce and maintain quality/reliable system by using open-source software. This book will serve as a textbook and reference book for graduate students and researchers in reliability for open-source software and modeling. Several methods of reliability assessment for open-source software are introduced. Our aim is to present state of the art of open-source software reliability measurement and assessment based on the stochastic modeling approach and recent research on this subject over the last 10 years. For example, the component-oriented reliability analysis based on AHP, ANP, and NHPP models, the stochastic differential equation models, and the hazard rate models are presented.

Chapter 1 introduces several aspects of software reliability, open-source software development paradigm, and its applications. Also, the basic concept of a mathematical model based on probability theory and statistics required to describe the software fault-detection or the software failure-occurrence phenomena and to estimate the software reliability quantitatively are introduced. Chapters 2 and 3 describe several methods of component-oriented reliability assessment based on AHP and ANP in order to consider the effect of each software component on the reliability of entire system under the distributed open-source development paradigm.

In case of the open-source software, it is necessary to grasp the situation of registration for bug tracking system, the degree of maturation of open-source software, and so on. Chapters 4–7 describe the methods of reliability assessment based on several stochastic models considering such characteristics from the standpoint of software reliability growth models. Chapters 8–10 provide several software tools for open-source software reliability assessment. These tools will be useful for software managers and engineers to assess the reliability of open-source software and embedded system software. Chapter 11 shows several numerical examples for the proposed methods of OSS reliability assessment based on several

actual data sets reported in the bug tracking systems for open-source projects. Also, Chap. 12 as the final part presents the performance illustrations for the developed tools.

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Shigeru Yamada

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Yamada, S.; Tamura, Y.

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