1. Record Nr. UNINA9910965908103321

Titolo	Statistical software engineering / / Panel on Statistical Methods in Software Engineering, Committee on Applied and Theoretical Statistics, Board on Mathematical Sciences, Commission on Physical Sciences, Mathematics, and Applications, National Research Council
Pubbl/distr/stampa	Washington, D.C., : National Academy Press, 1996
ISBN	9786610192748 9780309176088 0309176085 9781280192746 1280192747 9780309588546 0309588545 9780585002101 058500210X
Edizione	[1st ed.]
Descrizione fisica	1 online resource (83 p.)
Disciplina	005.1
Soggetti	Software engineering - Statistical methods
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Bibliographic Level Mode of Issuance: Monograph
Nota di bibliografia	Includes bibliographical references (p. 67-71).
Nota di contenuto	Statistical Software Engineering -- Copyright -- Preface -- Contents -- Executive Summary -- PURPOSE AND SCOPE OF THIS STUDY -- CONTENTS OF THIS REPORT -- STATISTICAL CHALLENGES -- SUMMARY AND CONCLUSIONS -- 1 Introduction -- 2 Case Study: NASA Space Shuttle Flight Control Software -- OVERVIEW OF REQUIREMENTS -- THE OPERATIONAL LIFE CYCLE -- A STATISTICAL APPROACH TO MANAGING THE SOFTWARE PRODUCTION PROCESS -- Fault Detection -- Safety Certification -- 3 A Software Production Model -- PROBLEM FORMULATION AND SPECIFICATION OF REQUIREMENTS -- DESIGN -- IMPLEMENTATION -- TESTING -- 4 Critique of Some Current Applications of Statistics in Software Engineering -- COST ESTIMATION -- Statistical Inadequacies in Estimating -- Process Volatility -- Maturity and Data Granularity -- Reliability of Model Inputs --

Managing to Estimates -- ASSESSMENT AND RELIABILITY -- Reliability Growth Modeling -- Influence of the Development Process on Software Dependability -- Influence of the Operational Environment on Software Dependability -- Safety-Critical Software and the Problem of Assuring Ultrahigh Dependability -- Design Diversity, Fault Tolerance, and General Issues of Dependence -- Judgment and Decision-making Framework -- Structural Modeling Issues -- Experimentation, Data Collection, and General Statistical Techniques -- SOFTWARE MEASUREMENT AND METRICS -- 5 Statistical Challenges -- SOFTWARE ENGINEERING EXPERIMENTAL ISSUES -- COMBINING INFORMATION -- VISUALIZATION IN SOFTWARE ENGINEERING -- Configuration Management Data -- Function Call Graphs -- Test Code Coverage -- Code Metrics -- Challenges for Visualization -- Opportunities for Visualization -- ORTHOGONAL DEFECT CLASSIFICATION -- 6 Summary and Conclusions -- INSTITUTIONAL MODEL FOR RESEARCH -- MODEL FOR DATA COLLECTION AND ANALYSIS -- ISSUES IN EDUCATION -- References -- Appendix: Forum Program.

Sommario/riassunto

This book identifies challenges and opportunities in the development and implementation of software that contain significant statistical content. While emphasizing the relevance of using rigorous statistical and probabilistic techniques in software engineering contexts, it presents opportunities for further research in the statistical sciences and their applications to software engineering. It is intended to motivate and attract new researchers from statistics and the mathematical sciences to attack relevant and pressing problems in the software engineering setting. It describes the "big picture," as this approach provides the context in which statistical methods must be developed. The book's survey nature is directed at the mathematical sciences audience, but software engineers should also find the statistical emphasis refreshing and stimulating. It is hoped that the book will have the effect of seeding the field of statistical software engineering by its indication of opportunities where statistical thinking can help to increase understanding, productivity, and quality of software and software production.