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| Nota di contenuto | Fault Trees; Table of Contents; Introduction; Chapter 1 Single-Component Systems; 1.1 Distribution of failure and reliability; 1.1.1 Function of distribution and density of failure; 1.1.2 Survival function: reliability; 1.1.3 Hazard rate; 1.1.4 Maintainability; 1.1.5 Mean times; 1.1.6 Mean residual lifetime; 1.1.7 Fundamental relationships; 1.1.8 Some probability distributions; 1.2 Availability of the repairable systems; 1.2.1 Instantaneous availability; 1.2.2 Asymptotic availability; 1.2.3 Mean availability; 1.2.4 Asymptotic mean availability; 1.3 Reliability in discrete time<br>1.3.1 Discrete distributions1.3.2 Reliability; 1.4 Reliability and maintenance; 1.4.1 Periodic test: repair time is negligible; 1.4.2 Periodic test: repair time is not negligible; 1.4.3 Mean duration of a hidden failure; 1.5 Reliability data; Chapter 2 Multi-Component Systems; 2.1 Structure function; 2.2 Modules and modular decomposition; 2.3 Elementary structure systems; 2.3.1 Series system; 2.3.2 Parallel system; 2.3.3 System k-out-of-n; 2.3.4 Parallel-series system; 2.3.5 Series-parallel system; 2.4 Systems with complex structure; 2.5 Probabilistic study of the systems; 2.5.1 Introduction |

2.5.2 Inclusion-exclusion method2.5.3 Disjoint products; 2.5.4 Factorization; 2.5.5 Reliability bounds; Chapter 3 Construction of Fault Trees; 3.1 Basic ideas and definitions; 3.1.1 Graphic symbols; 3.1.2 Use of the operators; 3.2 Formal definition and graphs; 3.3 Stages of construction; 3.3.1 Preliminary analysis; 3.3.2 Specifications; 3.3.3 Construction; 3.4 Example of construction; 3.4.1 Preliminary analysis; 3.4.2 Specifications; 3.4.3 Construction; 3.5 Automatic construction; Chapter 4 Minimal Sets; 4.1 Introduction; 4.2 Methods of study; 4.2.1 Direct methods; 4.2.2 Descending methods
4.2.3 Ascending methods4.3 Reduction; 4.4 Other algorithms for searching the cut sets; 4.5 Inversion of minimal cut sets; 4.6 Complexity of the search for minimal cut sets; Chapter 5 Probabilistic Assessment; 5.1 The problem of assessment; 5.2 Direct methods; 5.2.1 AND operator; 5.2.2 OR operator; 5.2.3 Exclusive OR operator; 5.2.4 k-out-of-n operator; 5.2.5 Priority-AND operator; 5.2.6 IF operator; 5.3 Methods of minimal sets; 5.3.1 Inclusion-exclusion development; 5.3.2 Disjoint products; 5.3.3 Kitt method; 5.4 Method of factorization; 5.5 Direct recursive methods
5.5.1 Recursive inclusion-exclusion method5.5.2 Method of recursive disjoint products; 5.6 Other methods for calculating the fault trees; 5.7 Large fault trees; 5.7.1 Method of Modarres and Dezfuli [MOD 84]; 5.7.2 Method of Hughes [HUG 87]; 5.7.3 Schneeweiss method [SCH 87]; 5.7.4 Brown method [BRO 90]; Chapter 6 Influence Assessment; 6.1 Uncertainty; 6.1.1 Introduction; 6.1.2 Methods for evaluating the uncertainty; 6.1.3 Evaluation of the moments; 6.2 Importance; 6.2.1 Introduction; 6.2.2 Structural importance factors; 6.2.3 Probabilistic importance factors
6.2.4 Importance factors over the uncertainty

Sommario/riassunto

Fault tree analysis is an important technique in determining the safety and dependability of complex systems. Fault trees are used as a major tool in the study of system safety as well as in reliability and availability studies.The basic methods - construction, logical analysis, probability evaluation and influence study - are described in this book. The following extensions of fault trees, non-coherent fault trees, fault trees with delay and multi-performance fault trees, are also explained. Traditional algorithms for fault tree analysis are presented, as well as more recent algorithms ba