

Applications of operations research and management science for military decision making

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Note sur le contenu : Intro; Preface; Addressing the Current Needs; Audience; Objectives; Organization; Contents; Chapter 1: Mathematical Modeling, Management Science, and Operations Research for Military Decision-Making; 1.1 Introduction to Decision-Making; 1.2 Mathematical Modeling and Decision-Making Framework; 1.2.1 Types of Decision Models; 1.2.1.1 Deterministic Models; 1.2.1.2 Stochastic Models; 1.2.2 Types of Data; 1.2.2.1 Qualitative Data and Ordinal Numbers; 1.2.2.2 Quantitative Data and Cardinal Numbers; 1.3 Steps in the Decision Process; 1.4 Illustrative Examples; 1.5 Technology; 1.6 Conclusions 1.7 Exercises 1.8 Projects; References; Suggested Reading; Chapter 2: Statistics and Probability in Military Decision-Making; 2.1 Introduction to Statistics and Statistical

Models; 2.2 Displaying Categorical Data; 2.2.1 Pie Chart; 2.2.2 Displaying Quantitative Data; 2.2.2.1 Stem and Leaf; 2.2.3 Symmetry Issues; 2.2.4 Boxplot Used for Comparisons; 2.2.4.1 Comparisons; 2.2.5 Measures of Central Tendency or Location; 2.2.5.1 Describing the Data; 2.2.5.2 The Mean; 2.2.5.3 The Median; 2.2.5.4 The Mode; 2.2.6 Measures of Dispersion; 2.2.6.1 Variance and Standard Deviation; 2.2.6.2 Measures of Symmetry and Skewness; 2.2.7 Section Exercises; 2.3 Classical Probability; 2.3.1 Introduction; 2.3.1.1 The Law of Large Numbers; 2.3.1.2 Properties of Probabilities; 2.3.1.3 Probability from Data; 2.3.1.4 Intersections and Unions; 2.3.1.5 The Addition Rule; 2.3.2 Conditional Probability; 2.3.3 Independence; 2.3.3.1 Definition of Independent Events; 2.3.3.2 Independent Events; 2.3.4 System Reliability in Series and Parallel of Independent Subsystems; 2.3.5 Bayes' Theorem; 2.3.5.1 Theorem of Total Probability; 2.3.5.2 Bayes' Theorem; 2.4 Probability Distributions; 2.4.1 Discrete Distributions in Modeling; 2.4.2 Poisson Distribution; 2.4.2.1 Section Exercises; 2.4.2.2 Chapter Projects Examples; 2.4.3 Continuous Probability Models; 2.4.3.1 Introduction; 2.4.3.2 The Normal Distribution; 2.4.4 Exercises; 2.4.5 Exponential Distribution; 2.5 Military Applications of Distributions; 2.5.1 Application of Probable Error in Targeting (Adapted from DA 3410 Course Notes, 2006); 2.5.1.1 Section Exercises; 2.5.2 Target Search Processes (Adapted from DA 3410 Course Notes, 2006); 2.5.2.1 Relative Motion; 2.5.2.2 Cookie Cutter Sensor; 2.5.2.3 Searching Without Overlap; 2.5.2.4 Arbitrary Search; 2.5.2.4 Random Search; 2.6 Central Limit Theorem, Confidence Intervals, and Hypothesis Testing; 2.6.1 Central Limit Theorem; 2.6.2 Confidence Intervals; 2.6.3 Simple Hypothesis Testing; 2.6.3.1 Interpretation; 2.6.3.2 Excel Templates; 2.6.3.3 Section Exercises; 2.6.3.4 Hypothesis Testing; 2.6.3.5 Notation and Definitions; 2.6.3.6 Hypothesis Testing; 2.7 Hypothesis Tests Summary Handout; 2.7.1 Tests with One Sample Mean; 2.7.2 Tests with a Population Proportion (Large Sample); 2.7.3 Tests Comparing Two Sample Means

Résumé ou extrait : La 4e de couv. indique : "Based on many years of applied research, modeling and educating future decision makers, the authors have selected the critical set of mathematical modeling skills for decision analysis to include in this book. The book focuses on the model formulation and modeling building skills, as well as the technology to support decision analysis. The authors cover many of the main techniques that have been incorporated into their three-course sequence in mathematical modeling for decision making in the Department of Defense Analysis at the Naval Postgraduate School. The primary objective of this book is illustrative in nature. It begins with an introduction to mathematical modeling and a process for formally thinking about difficult problems, illustrating many scenarios and illustrative examples. The book incorporates the necessary mathematical foundations for solving these problems with military applications and related military processes to reinforce the applied nature of the mathematical modeling process."

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