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The Cross-Entropy Method The Cross-Entropy Method The Cross-Entropy Method The Cross-entropy Method for Combinatorial Optimization, Rare Event Simulation and Neural Computation Cross-Entropy Method The Application of the Cross-entropy Method to the Estimation of Stiffness in Structures Applications of the Cross-entropy Method to Importance Sampling and Optimal Control of Diffusions The Maximum Entropy Method The Cross-entropy Method for Combinatorial Optimization with Applications The Cross-entropy Method for Estimation of Nonlinear Functions of Parameters in Bayesian VAR Models Cross-entropy Method in Telecommunication Systems The Cross-entropy Method with Patching for Rare-event Simulation of Large Markov Chains Cross-entropy Method for Combinatorial Optimization The Cross-entropy Method for Combinatorial and Continuous Optimization Vlsi Floor-planning Optimization Cross-entropy Method Weighted Cross Entropy Method for Robotics Applications Assessing the Spatial Distribution of Crop Production Using a Cross-Entropy Method The Suitability of the Cross Entropy Method for Solving the Travelling Salesman Problem Network-on-chip Floorplanning and Application Mapping Using Cross-entropy Method VLSI Floor Planning Optimization Using Genetic Algorithm and Cross Entropy Method A Particle-Swarm-Driven Cross-Entropy Method for Multiple-Input-Multiple-Output Signal Detection Semiparametric Cross Entropy for Rare-Event Simulation The Cross-entropy Method and Multiple Change-point Detection in Genomic Sequences A Cross-entropy Method Optimal Stopping Problems Extensions of the Cross-entropy Method with Applications to Diffusion Processes and Portfolio Losses Antenna Array Synthesis Using the Cross Entropy Method Simulation and the Monte Carlo Method Handbook of Monte Carlo Methods Computational Methods in Systems Biology Stochastic Optimization Solving the Vehicle Routing Problem with Stochastic Demands Using the Cross-entropy Method Fast Sequential Monte Carlo Methods for Counting and Optimization Stochastic Simulation Optimization Entropy Methods for Diffusive Partial Differential Equations Reinforcement Learning and Dynamic Programming Using Function Approximators Entropy Measures, Maximum Entropy Principle and Emerging Applications Probability for Machine Learning Monte Carlo Simulation with Applications to Finance Multi-criteria decision-making method based on a cross-entropy with interval neutrosophic sets Trends in Artificial Intelligence Theory and Applications. Artificial Intelligence Practices

Weighted Cross Entropy Method for Robotics Applications Nov 06 2021
Cross-entropy Method for Combinatorial Optimization Feb 09 2022
Cross-Entropy Method Oct 17 2022 The goal of this work is to study the application of the Cross-Entropy (CE) algorithm to problems in combinatorial optimization. This relatively new algorithm has been successfully applied to the Maximum Cut, the Travelling Salesperson, the Shortest Path problems, to Networks, Graph Coloring and other types of hard optimization problems. The CE method is based on an

adaptive generic randomized algorithm. It employs an auxiliary random mechanism (a distribution function) equipped with a set of parameters, which transforms the deterministic problem into a stochastic one. The CE algorithm is a multiple iteration procedure, where each iteration involves two phases: 1. Generation of random solutions using a parametric auxiliary distribution followed by a calculation of the associated objective function. 2. Updating the parameter vector, on the basis of the best scoring solutions generated. In the first part the question of convergence of the CE procedure is explored. Using tools from Information Geometry. The second part is more experimental. New applications of the CE for real-life problems are described.

The Application of the Cross-entropy Method to the Estimation of Stiffness in Structures Sep 16 2022

Simulation and the Monte Carlo Method Nov 25 2020 This accessible new edition explores the major topics in Monte Carlo simulation that have arisen over the past 30 years and presents a sound foundation for problem solving Simulation and the Monte Carlo Method, Third Edition reflects the latest developments in the field and presents a fully updated and comprehensive account of the state-of-the-art theory, methods and applications that have emerged in Monte Carlo simulation since the publication of the classic First Edition over more than a quarter of a century ago. While maintaining its accessible and intuitive approach, this revised edition features a wealth of up-to-date information that facilitates a deeper understanding of problem solving across a wide array of subject areas, such as engineering, statistics, computer science, mathematics, and the physical and life sciences. The book begins with a modernized introduction that addresses the basic concepts of probability, Markov processes, and convex optimization. Subsequent chapters discuss the dramatic changes that have occurred in the field of the Monte Carlo method, with coverage of many modern topics including: Markov Chain Monte Carlo, variance reduction techniques such as importance (re-)sampling, and the transform likelihood ratio method, the score function method for sensitivity analysis, the stochastic approximation method and the stochastic counter-part method for Monte Carlo optimization, the cross-entropy method for rare events estimation and combinatorial optimization, and application of Monte Carlo techniques for counting problems. An extensive range of exercises is provided at the end of each chapter, as well as a generous sampling of applied examples. The Third Edition features a new chapter on the highly versatile splitting method, with applications to rare-event estimation, counting, sampling, and optimization. A second new chapter introduces the stochastic enumeration method, which is a new fast sequential Monte Carlo method for tree search. In addition, the Third Edition features new material on: • Random number generation, including multiple-recursive generators and the Mersenne Twister • Simulation of Gaussian processes, Brownian motion, and diffusion processes • Multilevel Monte Carlo method • New enhancements of the cross-entropy (CE) method, including the “improved” CE method, which uses sampling from the zero-variance distribution to find the optimal importance sampling parameters • Over 100 algorithms in modern pseudo code with flow control • Over 25 new exercises Simulation and the Monte Carlo Method, Third Edition is an excellent text for upper-undergraduate and beginning graduate courses in stochastic simulation and Monte Carlo techniques. The book also serves as a valuable reference for professionals who would like to achieve a more formal understanding of the Monte Carlo method. Reuven Y. Rubinstein, DSc, was Professor Emeritus in the Faculty of Industrial Engineering and Management at Technion-Israel Institute of Technology. He served as a consultant at numerous large-scale organizations, such as IBM, Motorola, and NEC. The author of over 100 articles and six books, Dr. Rubinstein was also the inventor of the popular score-function method in simulation analysis and generic cross-entropy methods for combinatorial optimization and counting. Dirk P. Kroese, PhD, is a Professor of Mathematics and Statistics in the School of Mathematics and Physics of The University of Queensland, Australia. He has published over 100 articles and four books in a wide range of areas in

applied probability and statistics, including Monte Carlo methods, cross-entropy, randomized algorithms, tele-traffic c theory, reliability, computational statistics, applied probability, and stochastic modeling.

The Cross-entropy Method for Combinatorial Optimization, Rare Event Simulation and Neural Computation Nov 18 2022

The Suitability of the Cross Entropy Method for Solving the Travelling Salesman Problem Sep 04 2021

A Cross-entropy Method Optimal Stopping Problems Feb 26 2021 There are frequent situations when observations are recorded consecutively over a period of time, for an example, daily values of currency exchange rates. Sequential observations appear one by one, so data are analysed as they are collected without fixing the sample size in advance. Further sampling may be terminated according to a pre-defined stopping rule. There are situations where we need to make decisions considering the observations which are already having while future observations are not known yet. Sequential data analysis has a variety of applications in a wide range of fields including industrial quality control, econometrics, analysis of financial systems among many others. In this thesis, we develop several versions of a Cross-Entropy method to find an approximate optimal stopping rule. Here we have considered cases of both independent and dependent observations. We have carried out a simulation study., which has shown the accuracy of the proposed algorithm.

Trends in Artificial Intelligence Theory and Applications. Artificial Intelligence Practices Oct 13 2019 This book constitutes the thoroughly refereed proceedings of the 33rd International Conference on Industrial, Engineering and Other Applications of Applied Intelligent Systems, IEA/AIE 2020, held in Kitakyushu, Japan, in September 2020. The 62 full papers and 17 short papers presented were carefully reviewed and selected from 119 submissions. The IEA/AIE 2020 conference will continue the tradition of emphasizing on applications of applied intelligent systems to solve real-life problems in all areas. These areas include are language processing; robotics and drones; knowledge based systems; innovative applications of intelligent systems; industrial applications; networking applications; social network analysis; financial applications and blockchain; medical and health-related applications; anomaly detection and automated diagnosis; decision-support and agent-based systems; multimedia applications; machine learning; data management and data clustering; pattern mining; system control, classification, and fault diagnosis.

Assessing the Spatial Distribution of Crop Production Using a Cross-Entropy Method Oct 05 2021

The Cross-entropy Method for Combinatorial and Continuous Optimization Jan 08 2022

Entropy Methods for Diffusive Partial Differential Equations Apr 18 2020 This book presents a range of entropy methods for diffusive PDEs devised by many researchers in the course of the past few decades, which allow us to understand the qualitative behavior of solutions to diffusive equations (and Markov diffusion processes). Applications include the large-time asymptotics of solutions, the derivation of convex Sobolev inequalities, the existence and uniqueness of weak solutions, and the analysis of discrete and geometric structures of the PDEs. The purpose of the book is to provide readers an introduction to selected entropy methods that can be found in the research literature. In order to highlight the core concepts, the results are not stated in the widest generality and most of the arguments are only formal (in the sense that the functional setting is not specified or sufficient regularity is supposed). The text is also suitable for advanced master and PhD students and could serve as a textbook for special courses and seminars.

Entropy Measures, Maximum Entropy Principle and Emerging Applications Feb 15 2020 The last two decades have witnessed an enormous growth with regard to ap plications of information theoretic framework in areas of physical, biological, engineering and even social sciences. In particular, growth has been spectac ular in the field of information technology,soft computing,nonlinear systems and molecular biology. Claude Shannon in 1948 laid the foundation of the field of information

theory in the context of communication theory. It is in deed remarkable that his framework is as relevant today as was when he 1 proposed it. Shannon died on Feb 24, 2001. Arun Netravali observes "As if assuming that inexpensive, high-speed processing would come to pass, Shan non figured out the upper limits on communication rates. First in telephone channels, then in optical communications, and now in wireless, Shannon has had the utmost value in defining the engineering limits we face". Shannon introduced the concept of entropy. The notable feature of the entropy frame work is that it enables quantification of uncertainty present in a system. In many realistic situations one is confronted only with partial or incomplete information in the form of moment, or bounds on these values etc. ; and it is then required to construct a probabilistic model from this partial information. In such situations, the principle of maximum entropy provides a rational ba sis for constructing a probabilistic model. It is thus necessary and important to keep track of advances in the applications of maximum entropy principle to ever expanding areas of knowledge.

Semiparametric Cross Entropy for Rare-Event Simulation Apr 30 2021 The Cross Entropy method is a well-known adaptive importance sampling method for rare-event probability estimation, which requires estimating an optimal importance sampling density within a parametric class. In this article we estimate an optimal importance sampling density within a wider semiparametric class of distributions. We show that this semiparametric version of the Cross Entropy method frequently yields efficient estimators. We illustrate the excellent practical performance of the method with numerical experiments and show that for the problems we consider it typically outperforms alternative schemes by orders of magnitude.

The Cross-Entropy Method Jan 20 2023 Rubinstein is the pioneer of the well-known score function and cross-entropy methods. Accessible to a broad audience of engineers, computer scientists, mathematicians, statisticians and in general anyone, theorist and practitioner, who is interested in smart simulation, fast optimization, learning algorithms, and image processing.

Solving the Vehicle Routing Problem with Stochastic Demands Using the Cross-entropy Method Jul 22 2020

Vlsi Floor-planning Optimization Cross-entropy Method Dec 07 2021

Monte Carlo Simulation with Applications to Finance Dec 15 2019 Developed from the author’s course on Monte Carlo simulation at Brown University, Monte Carlo Simulation with Applications to Finance provides a self-contained introduction to Monte Carlo methods in financial engineering. It is suitable for advanced undergraduate and graduate students taking a one-semester course or for practitioners in the financial industry. The author first presents the necessary mathematical tools for simulation, arbitrary free option pricing, and the basic implementation of Monte Carlo schemes. He then describes variance reduction techniques, including control variates, stratification, conditioning, importance sampling, and cross-entropy. The text concludes with stochastic calculus and the simulation of diffusion processes. Only requiring some familiarity with probability and statistics, the book keeps much of the mathematics at an informal level and avoids technical measure-theoretic jargon to provide a practical understanding of the basics. It includes a large number of examples as well as MATLAB® coding exercises that are designed in a progressive manner so that no prior experience with MATLAB is needed.

Computational Methods in Systems Biology Sep 23 2020 This book constitutes the refereed proceedings of the 16th International Conference on Computational Methods in Systems Biology, CMSB 2018, held in BRNO, Czech Republic, in September 2018. The 15 full and 7 short papers presented together with 5 invited talks were carefully reviewed and selected from 46 submissions. Topics of interest include formalisms for modeling biological processes; models and their biological applications; frameworks for model verification, validation, analysis, and simulation of biological systems; high-performance computational systems biology; parameter and model inference from experimental data; automated parameter and model synthesis; model integration and biological databases; multi-

scale modeling and analysis methods; design, analysis, and verification methods for synthetic biology; methods for biomolecular computing and engineered molecular devices. Chapters 3, 9 and 10 are available open access under a Creative Commons Attribution 4.0 International License via link.springer.com.

Multi-criteria decision-making method based on a cross-entropy with interval neutrosophic sets Nov 13 2019 In this paper, two optimisation models are established to determine the criterion weights in multi-criteria decision-making situations where knowledge regarding the weight information is incomplete and the criterion values are interval neutrosophic numbers.

Reinforcement Learning and Dynamic Programming Using Function Approximators Mar 18 2020 From household appliances to applications in robotics, engineered systems involving complex dynamics can only be as effective as the algorithms that control them. While Dynamic Programming (DP) has provided researchers with a way to optimally solve decision and control problems involving complex dynamic systems, its practical value was limited by algorithms that lacked the capacity to scale up to realistic problems. However, in recent years, dramatic developments in Reinforcement Learning (RL), the model-free counterpart of DP, changed our understanding of what is possible. Those developments led to the creation of reliable methods that can be applied even when a mathematical model of the system is unavailable, allowing researchers to solve challenging control problems in engineering, as well as in a variety of other disciplines, including economics, medicine, and artificial intelligence. Reinforcement Learning and Dynamic Programming Using Function Approximators provides a comprehensive and unparalleled exploration of the field of RL and DP. With a focus on continuous-variable problems, this seminal text details essential developments that have substantially altered the field over the past decade. In its pages, pioneering experts provide a concise introduction to classical RL and DP, followed by an extensive presentation of the state-of-the-art and novel methods in RL and DP with approximation. Combining algorithm development with theoretical guarantees, they elaborate on their work with illustrative examples and insightful comparisons. Three individual chapters are dedicated to representative algorithms from each of the major classes of techniques: value iteration, policy iteration, and policy search. The features and performance of these algorithms are highlighted in extensive experimental studies on a range of control applications. The recent development of applications involving complex systems has led to a surge of interest in RL and DP methods and the subsequent need for a quality resource on the subject. For graduate students and others new to the field, this book offers a thorough introduction to both the basics and emerging methods. And for those researchers and practitioners working in the fields of optimal and adaptive control, machine learning, artificial intelligence, and operations research, this resource offers a combination of practical algorithms, theoretical analysis, and comprehensive examples that they will be able to adapt and apply to their own work. Access the authors' website at www.dcsc.tudelft.nl/rlbook/ for additional material, including computer code used in the studies and information concerning new developments.

The Cross-entropy Method with Patching for Rare-event Simulation of Large Markov Chains Mar 10 2022

The Cross-Entropy Method Dec 19 2022

The Maximum Entropy Method Jul 14 2022 Forty years ago, in 1957, the Principle of Maximum Entropy was first intro duced by Jaynes into the field of statistical mechanics. Since that seminal publication, this principle has been adopted in many areas of science and technology beyond its initial application. It is now found in spectral analysis, image restoration and a number of branches ofmathematics and physics, and has become better known as the Maximum Entropy Method (MEM). Today MEM is a powerful means to deal with ill-posed problems, and much research work is devoted to it. My own research in the area ofMEM started in 1980, when I was a grad uate student in the Department of Electrical Engineering at the

University of Sydney, Australia. This research work was the basis of my Ph.D. the sis, The Maximum Entropy Method and Its Application in Radio Astronomy, completed in 1985. As well as continuing my research in MEM after graduation, I taught a course of the same name at the Graduate School, Chinese Academy of Sciences, Beijingfrom 1987to 1990. Delivering the course was theimpetus for developing a structured approach to the understanding of MEM and writing hundreds of pages of lecture notes.

Probability for Machine Learning Jan 16 2020 Probability is the bedrock of machine learning. You cannot develop a deep understanding and application of machine learning without it. Cut through the equations, Greek letters, and confusion, and discover the topics in probability that you need to know. Using clear explanations, standard Python libraries, and step-by-step tutorial lessons, you will discover the importance of probability to machine learning, Bayesian probability, entropy, density estimation, maximum likelihood, and much more.

The Cross-entropy Method and Multiple Change-point Detection in Genomic Sequences Mar 30 2021 The overall research aim of this thesis is to introduce the Cross-Entropy (CE) method, a model-based stochastic optimization procedure that nests under the branch of evolutionary computing techniques, to establish both the number of change-points and their locations in biological sequences. Particularly we focused on analyzing array comparative genomic hybridization (aCGH) data and DNA read count data obtained through next generation sequencing (NGS) methods.

VLSI Floor Planning Optimization Using Genetic Algorithm and Cross Entropy Method Jul 02 2021

Applications of the Cross-entropy Method to Importance Sampling and Optimal Control of Diffusions Aug 15 2022

The Cross-Entropy Method Feb 21 2023 Rubinstein is the pioneer of the well-known score function and cross-entropy methods. Accessible to a broad audience of engineers, computer scientists, mathematicians, statisticians and in general anyone, theorist and practitioner, who is interested in smart simulation, fast optimization, learning algorithms, and image processing.

The Cross-entropy Method for Combinatorial Optimization with Applications Jun 13 2022

Stochastic Optimization Aug 23 2020 Stochastic programming is the study of procedures for decision making under the presence of uncertainties and risks. Stochastic programming approaches have been successfully used in a number of areas such as energy and production planning, telecommunications, and transportation. Recently, the practical experience gained in stochastic programming has been expanded to a much larger spectrum of applications including financial modeling, risk management, and probabilistic risk analysis. Major topics in this volume include: (1) advances in theory and implementation of stochastic programming algorithms; (2) sensitivity analysis of stochastic systems; (3) stochastic programming applications and other related topics. Audience: Researchers and academies working in optimization, computer modeling, operations research and financial engineering. The book is appropriate as supplementary reading in courses on optimization and financial engineering.

Cross-entropy Method in Telecommunication Systems Apr 11 2022

Handbook of Monte Carlo Methods Oct 25 2020 A comprehensive overview of Monte Carlo simulation that explores the latest topics, techniques, and real-world applications More and more of today’s numerical problems found in engineering and finance are solved through Monte Carlo methods. The heightened popularity of these methods and their continuing development makes it important for researchers to have a comprehensive understanding of the Monte Carlo approach. Handbook of Monte Carlo Methods provides the theory, algorithms, and applications that helps provide a thorough understanding of the emerging dynamics of this rapidly-growing field. The authors begin with a discussion of fundamentals such as how to generate random numbers on a computer. Subsequent chapters discuss key Monte Carlo topics and methods,

including: Random variable and stochastic process generation Markov chain Monte Carlo, featuring key algorithms such as the Metropolis-Hastings method, the Gibbs sampler, and hit-and-run Discrete-event simulation Techniques for the statistical analysis of simulation data including the delta method, steady-state estimation, and kernel density estimation Variance reduction, including importance sampling, latin hypercube sampling, and conditional Monte Carlo Estimation of derivatives and sensitivity analysis Advanced topics including cross-entropy, rare events, kernel density estimation, quasi Monte Carlo, particle systems, and randomized optimization The presented theoretical concepts are illustrated with worked examples that use MATLAB®, a related Web site houses the MATLAB® code, allowing readers to work hands-on with the material and also features the author's own lecture notes on Monte Carlo methods. Detailed appendices provide background material on probability theory, stochastic processes, and mathematical statistics as well as the key optimization concepts and techniques that are relevant to Monte Carlo simulation. Handbook of Monte Carlo Methods is an excellent reference for applied statisticians and practitioners working in the fields of engineering and finance who use or would like to learn how to use Monte Carlo in their research. It is also a suitable supplement for courses on Monte Carlo methods and computational statistics at the upper-undergraduate and graduate levels.

Extensions of the Cross-entropy Method with Applications to Diffusion Processes and Portfolio Losses Jan 28 2021 Rare event simulation is a crucial part of simulations. In nancial mathematics, the study of rare events appear naturally when we consider risk measures such as the conditional value at risk. This thesis is composed of three related papers treating the rare event simulations subject: the rst paper addresses rare event simulations for di usion processes, the second paper addresses rare event simulations for the normal and the Student t-copula model while the last paper addresses rare event simulations for a portfolio model where there is a correlation structure between the loss-given- default and the probability of default.

Network-on-chip Floorplanning and Application Mapping Using Cross-entropy Method Aug 03 2021

Fast Sequential Monte Carlo Methods for Counting and Optimization Jun 20 2020 A comprehensive account of the theory and application of Monte Carlo methods Based on years of research in efficient Monte Carlo methods for estimation of rare-event probabilities, counting problems, and combinatorial optimization, Fast Sequential Monte Carlo Methods for Counting and Optimization is a complete illustration of fast sequential Monte Carlo techniques. The book provides an accessible overview of current work in the field of Monte Carlo methods, specifically sequential Monte Carlo techniques, for solving abstract counting and optimization problems. Written by authorities in the field, the book places emphasis on cross-entropy, minimum cross-entropy, splitting, and stochastic enumeration. Focusing on the concepts and application of Monte Carlo techniques, Fast Sequential Monte Carlo Methods for Counting and Optimization includes: Detailed algorithms needed to practice solving real-world problems Numerous examples with Monte Carlo method produced solutions within the 1-2% limit of relative error A new generic sequential importance sampling algorithm alongside extensive numerical results An appendix focused on review material to provide additional background information Fast Sequential Monte Carlo Methods for Counting and Optimization is an excellent resource for engineers, computer scientists, mathematicians, statisticians, and readers interested in efficient simulation techniques. The book is also useful for upper-undergraduate and graduate-level courses on Monte Carlo methods.

Antenna Array Synthesis Using the Cross Entropy Method Dec 27 2020 In this work, single and multi-objective optimization using both continuous and combinatorial forms of the CE method are performed to shape the sidelobe power, mainlobe beamwidth, null depths and locations as well as number of active elements of linear array antennas by controlling the spacings and complex array excitations of each

element in the array. Specifically, aperiodic arrays are designed through both non-uniform element spacings and thinning active array elements, while phased array antennas are designed by controlling the complex excitation applied to each element of the array. The performance of the CE method is demonstrated by considering different scenarios adopted from literature addressing more popular stochastic optimization techniques such as the Genetic Algorithm (GA) or Particle Swarm Optimization. The primary technical contributions of this dissertation are the simulation results computed using the Cross Entropy method for the different scenarios adopted from literature. Cursory comparisons are made to the results from the literature, but the overall goal of this work is to expose the tendencies of the Cross Entropy method for array synthesis problems and help the reader to make an educated decision when considering the Cross Entropy method for their own problems. Overall, the CE method is a competitive alternative to these more popular techniques, possessing attractive convergence properties, but requiring larger population sizes.

A Particle-Swarm-Driven Cross-Entropy Method for Multiple-Input-Multiple-Output Signal Detection Jun 01 2021

Stochastic Simulation Optimization May 20 2020 With the advance of new computing technology, simulation is becoming very popular for designing large, complex and stochastic engineering systems, since closed-form analytical solutions generally do not exist for such problems. However, the added flexibility of simulation often creates models that are computationally intractable. Moreover, to obtain a sound statistical estimate at a specified level of confidence, a large number of simulation runs (or replications) is usually required for each design alternative. If the number of design alternatives is large, the total simulation cost can be very expensive. Stochastic Simulation Optimization addresses the pertinent efficiency issue via smart allocation of computing resource in the simulation experiments for optimization, and aims to provide academic researchers and industrial practitioners with a comprehensive coverage of OCBA approach for stochastic simulation optimization. Starting with an intuitive explanation of computing budget allocation and a discussion of its impact on optimization performance, a series of OCBA approaches developed for various problems are then presented, from the selection of the best design to optimization with multiple objectives. Finally, this book discusses the potential extension of OCBA notion to different applications such as data envelopment analysis, experiments of design and rare-event simulation.

The Cross-entropy Method for Estimation of Nonlinear Functions of Parameters in Bayesian VAR Models May 12 2022 In this dissertation, an adaptive importance sampling method for estimation of the expected value of nonlinear function of parameters under the posterior density in Bayesian VAR model is developed. Most Bayesian inference problems can be expressed as the evaluation of the expectation of a function of interest, usually as a nonlinear function of the model parameters, under the posterior distribution. Nonlinear functions in Bayesian VAR setting are difficult to estimate and usually require numerical methods for their evaluation. In this dissertation, a weighted importance sampling estimator is used for the evaluation of the posterior expectation. The optimal importance sampling density, which minimizes the variance of the estimator, is in general difficult to evaluate and cannot be used in practice as the normalization constant of the density depends on the marginal likelihood. The proposed importance sampling approach uses cross-entropy method for determination of the importance sampling density. With cross-entropy approach the importance sampling density is chosen from a specified family of densities such that the cross-entropy distance or Kullback-Leibler divergence between the optimal importance sampling density and importance density is minimal. The performance of the proposed importance sampling algorithm with cross-entropy method is assessed in iterated multi-step forecasting of US macroeconomic time series.