

# Evolutionary Computation in Computational Finance & Economics

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# Evolutionary Computation In Economics And Finance

**S. H. Chen**



## **Evolutionary Computation In Economics And Finance:**

**Evolutionary Computation in Economics and Finance** S. H. Chen, 2000      Evolutionary Computation in Economics and Finance Shu-Heng Chen, 2002-05-27 After a decade's development evolutionary computation EC proves to be a powerful tool kit for economic analysis While the demand for this equipment is increasing there is no volume exclusively written for economists This volume for the first time helps economists to get a quick grasp on how EC may support their research A comprehensive coverage of the subject is given that includes the following three areas game theory agent based economic modelling and financial engineering Twenty leading scholars from each of these areas contribute a chapter to the volume The reader will find himself treading the path of the history of this research area from the fledgling stage to the burgeoning era The results on games labour markets pollution control institution and productivity financial markets trading systems design and derivative pricing are new and interesting for different target groups The book also includes informations on web sites conferences and computer software      *Evolutionary Computation in Economics and Finance* Shu-Heng Chen, 2013-11-11 After a decade's development evolutionary computation EC proves to be a powerful tool kit for economic analysis While the demand for this equipment is increasing there is no volume exclusively written for economists This volume for the first time helps economists to get a quick grasp on how EC may support their research A comprehensive coverage of the subject is given that includes the following three areas game theory agent based economic modelling and financial engineering Twenty leading scholars from each of these areas contribute a chapter to the volume The reader will find himself treading the path of the history of this research area from the fledgling stage to the burgeoning era The results on games labour markets pollution control institution and productivity financial markets trading systems design and derivative pricing are new and interesting for different target groups The book also includes informations on web sites conferences and computer software

**Computational Intelligence in Economics and Finance** Paul P. Wang, Tzu-Wen Kuo, 2007-07-11 Computational intelligence CI as an alternative to statistical and econometric approaches has been applied to a wide range of economics and finance problems in recent years for example to price forecasting and market efficiency This book contains research ranging from applications in financial markets and business administration to various economics problems Not only are empirical studies utilizing various CI algorithms presented but so also are theoretical models based on computational methods In addition to direct applications of computational intelligence readers can also observe how these methods are combined with conventional analytical methods such as statistical and econometric models to yield preferred results Chen Wang and Kuo have grouped the 12 contributions following their introductory chapter into applications of fuzzy logic neural networks including self organizing maps and support vector machines and evolutionary computation All chapters were selected either by invitation or based on a careful selection and extension of best papers from the International Workshop on Computational Intelligence in Economics and Finance in 2005 Overall the book offers researchers an excellent overview of current advances

and applications of computational intelligence techniques to economics and finance problems      **Computational**

**Intelligence in Economics and Finance** Paul P. Wang, 2013-03-09 Due to the ability to handle specific characteristics of economics and finance forecasting problems like e.g. non linear relationships behavioral changes or knowledge based domain segmentation we have recently witnessed a phenomenal growth of the application of computational intelligence methodologies in this field In this volume Chen and Wang collected not just works on traditional computational intelligence approaches like fuzzy logic neural networks and genetic algorithms but also examples for more recent technologies like e.g. rough sets support vector machines wavelets or ant algorithms After an introductory chapter with a structural description of all the methodologies the subsequent parts describe novel applications of these to typical economics and finance problems like business forecasting currency crisis discrimination foreign exchange markets or stock markets behavior      Natural

Computing in Computational Finance Anthony Brabazon, Michael O'Neill, 2009-03-13 Recent years have seen the widespread application of Natural Computing algorithms broadly defined in this context as computer algorithms whose design draws inspiration from phenomena in the natural world for the purposes of financial modelling and optimisation A related stream of work has also seen the application of learning mechanisms drawn from Natural Computing algorithms for the purposes of agent based modelling in finance and economics In this book we have collected a series of chapters which illustrate these two faces of Natural Computing The first part of the book illustrates how algorithms inspired by the natural world can be used as problem solvers to uncover and optimise financial models The second part of the book examines a number agent based simulations of financial systems This book follows on from Natural Computing in Computational Finance Volume 100 in Springer's Studies in Computational Intelligence series which in turn arose from the success of EvoFIN 2007 the very first European Workshop on Evolutionary Computation in Finance Economics held in Valencia Spain in April 2007      Genetic

Algorithms and Genetic Programming in Computational Finance Shu-Heng Chen, 2012-12-06 After a decade of development genetic algorithms and genetic programming have become a widely accepted toolkit for computational finance Genetic Algorithms and Genetic Programming in Computational Finance is a pioneering volume devoted entirely to a systematic and comprehensive review of this subject Chapters cover various areas of computational finance including financial forecasting trading strategies development cash flow management option pricing portfolio management volatility modeling arbitraging and agent based simulations of artificial stock markets Two tutorial chapters are also included to help readers quickly grasp the essence of these tools Finally a menu driven software program Simple GP accompanies the volume which will enable readers without a strong programming background to gain hands on experience in dealing with much of the technical material introduced in this work      *The Oxford Handbook of Computational Economics and Finance* Shu-Heng Chen, Mak Kaboudan, Ye-Rong Du, 2018 The Oxford Handbook of Computational Economics and Finance provides a survey of both the foundations of and recent advances in the frontiers of analysis and action It is both historically and interdisciplinarily rich

and also tightly connected to the rise of digital society It begins with the conventional view of computational economics including recent algorithmic development in computing rational expectations volatility and general equilibrium It then moves from traditional computing in economics and finance to recent developments in natural computing including applications of nature inspired intelligence genetic programming swarm intelligence and fuzzy logic Also examined are recent developments of network and agent based computing in economics How these approaches are applied is examined in chapters on such subjects as trading robots and automated markets The last part deals with the epistemology of simulation in its trinity form with the integration of simulation computation and dynamics Distinctive is the focus on natural computationalism and the examination of the implications of intelligent machines for the future of computational economics and finance Not merely individual robots but whole integrated systems are extending their immigration to the world of Homo sapiens or symbiogenesis

**Applications of Evolutionary Computation** Cecilia Di Chio,Anthony Brabazon,Marc Ebner,Muddassar Farooq,Andreas Fink,Jörn Grahl,Gary Greenfield,Penousal Machado,Michael O'Neill,Ernesto Tarantino,Neil Urquhart,2010-03-25 This book constitutes the refereed proceedings of the International Workshops on the Applications of Evolutionary Computation EvoApplications 2010 held in Istanbul Turkey in April 2010 colocated with the Evo 2010 events Thanks to the large number of submissions received the proceedings for EvoApplications 2010 are divided across two volumes LNCS 6024 and 6025 The present volume contains contributions for EvoCOMNET EvoENVIRONMENT EvoFIN EvoMUSART and EvoTRANSLOG The 47 revised full papers presented were carefully reviewed and selected from a total of 86 submissions This volume presents a careful selection of relevant EC examples combined with a thorough examination of the techniques used in EC The papers in the volume illustrate the current state of the art in the application of EC and should help and inspire researchers and professionals to develop efficient EC methods for design and problem solving

*Agent-Based Computational Economics* Shu-Heng Chen,2017-09-19 This book aims to answer two questions that are fundamental to the study of agent based economic models what is agent based computational economics and why do we need agent based economic modelling of economy This book provides a review of the development of agent based computational economics ACE from a perspective on how artificial economic agents are designed under the influences of complex sciences experimental economics artificial intelligence evolutionary biology psychology anthropology and neuroscience This book begins with a historical review of ACE by tracing its origins From a modelling viewpoint ACE brings truly decentralized procedures into market analysis from a single market to the whole economy This book also reviews how experimental economics and artificial intelligence have shaped the development of ACE For the former the book discusses how ACE models can be used to analyse the economic consequences of cognitive capacity personality and cultural inheritance For the latter the book covers the various tools used to construct artificial adaptive agents including reinforcement learning fuzzy decision rules neural networks and evolutionary computation This book will be of interest to graduate students researching

computational economics experimental economics behavioural economics and research methodology      *Computational Economics* Shu-Heng Chen, L. C. Jain, Chung-Ching Tai, 2006-01-01 This book identifies the economic as well as financial problems that may be solved efficiently with computational methods and explains why those problems should best be solved with computational methods Provided by publisher      **Multi-Agent Applications with Evolutionary Computation and Biologically Inspired Technologies: Intelligent Techniques for Ubiquity and Optimization** Chen,

Shu-Heng, Kambayashi, Yasushi, Sato, Hiroshi, 2010-07-31 This book compiles numerous ongoing projects and research efforts in the design of agents in light of recent development in neurocognitive science and quantum physics providing readers with interdisciplinary applications of multi agents systems ranging from economics to engineering Provided by publisher

**Artificial Intelligence, Learning and Computation in Economics and Finance** Ragupathy Venkatachalam, 2023-02-15 This book presents frontier research on the use of computational methods to model complex interactions in economics and finance Artificial Intelligence Machine Learning and simulations offer effective means of analyzing and learning from large as well as new types of data These computational tools have permeated various subfields of economics finance and also across different schools of economic thought Through 16 chapters written by pioneers in economics finance computer science psychology complexity and statistics econometrics the book introduces their original research and presents the findings they have yielded Theoretical and empirical studies featured in this book draw on a variety of approaches such as agent based modeling numerical simulations computable economics as well as employing tools from artificial intelligence and machine learning algorithms The use of computational approaches to perform counterfactual thought experiments are also introduced which help transcend the limits posed by traditional mathematical and statistical tools The book also includes discussions on methodology epistemology history and issues concerning prediction validation and inference all of which have become pertinent with the increasing use of computational approaches in economic analysis

**Computational Intelligence: A Compendium** John Fulcher, 2008-05-28 Computational Intelligence A Compendium presents a well structured overview about this rapidly growing field with contributions from leading experts in Computational Intelligence The main focus of the compendium is on applied methods tried and proven as being effective to realworld problems which is especially useful for practitioners researchers students and also newcomers to the field This state of handbook style book has contributions by leading experts      **Natural Computing in Computational Finance** Anthony Brabazon, Michael O'Neill, Dietmar G. Maringer, 2010-07-11 The chapters in this book illustrate the application of a range of cutting edge natural computing and agent based methodologies in computational finance and economics The eleven chapters were selected following a rigorous peer reviewed selection process      *Encyclopedia of Machine Learning* Claude Sammut, Geoffrey I. Webb, 2011-03-28 This comprehensive encyclopedia in A Z format provides easy access to relevant information for those seeking entry into any aspect within the broad field of Machine Learning Most of the entries in this

preeminent work include useful literature references Routledge Handbook of Behavioral Economics Roger Frantz, Shu-Heng Chen, Kurt Dopfer, Floris Heukelom, Shabnam Mousavi, 2016-08-05 There is no doubt that behavioral economics is becoming a dominant lens through which we think about economics Behavioral economics is not a single school of thought but representative of a range of approaches and uniquely this volume presents an overview of them The wide spectrum of international contributors each provides an exploration of a central approach aspect or topic in behavioral economics Taken together the whole volume provides a comprehensive overview of the subject which considers both key developments and future possibilities Part One presents several different approaches to behavioural economics including George Katona Ken Boulding Harvey Leibenstein Vernon Smith Herbert Simon Gerd Gigerenzer Daniel Kahneman and Richard Thaler This section looks at the origins and development of behavioral economics and compares and contrasts the work of these scholars who have been so influential in making this area so prominent Part Two presents applications of behavioural economics including nudging heuristics emotions and morality behavioural political economy education and economic innovation The Routledge Handbook of Behavioral Economics is ideal for advanced economics students and faculty who are looking for a complete state of the art overview of this dynamic field *Simulation in Computational Finance and Economics: Tools and Emerging Applications* Alexandrova-Kabadjova, Biliiana, Martinez-Jaramillo, Serafin, Garcia-Almanza, Alma Lilia, Tsang, Edward, 2012-08-31 Simulation has become a tool difficult to substitute in many scientific areas like manufacturing medicine telecommunications games etc Finance is one of such areas where simulation is a commonly used tool for example we can find Monte Carlo simulation in many financial applications like market risk analysis portfolio optimization credit risk related applications etc Simulation in Computational Finance and Economics Tools and Emerging Applications presents a thorough collection of works covering several rich and highly productive areas of research including Risk Management Agent Based Simulation and Payment Methods and Systems topics that have found new motivations after the strong recession experienced in the last few years Despite the fact that simulation is widely accepted as a prominent tool dealing with a simulation based project requires specific management abilities of the researchers Economic researchers will find an excellent reference to introduce them to the computational simulation models The works presented in this book can be used as an inspiration for economic researchers interested in creating their own computational models in their respective fields **EVOLVE- A Bridge between Probability, Set Oriented Numerics and Evolutionary Computation** Emilia Tantar, Alexandru-Adrian Tantar, Pascal Bouvry, Pierre Del Moral, Pierrick Legrand, Carlos A. Coello Coello, Oliver Schütze, 2012-09-14 The aim of this book is to provide a strong theoretical support for understanding and analyzing the behavior of evolutionary algorithms as well as for creating a bridge between probability set oriented numerics and evolutionary computation The volume encloses a collection of contributions that were presented at the EVOLVE 2011 international workshop held in Luxembourg May 25 27 2011 coming from invited speakers and also from selected regular

submissions The aim of EVOLVE is to unify the perspectives offered by probability set oriented numerics and evolutionary computation EVOLVE focuses on challenging aspects that arise at the passage from theory to new paradigms and practice elaborating on the foundations of evolutionary algorithms and theory inspired methods merged with cutting edge techniques that ensure performance guarantee factors EVOLVE is also intended to foster a growing interest for robust and efficient methods with a sound theoretical background The chapters enclose challenging theoretical findings concrete optimization problems as well as new perspectives By gathering contributions from researchers with different backgrounds the book is expected to set the basis for a unified view and vocabulary where theoretical advancements may echo in different domains

**Meta-Heuristics Optimization Algorithms in Engineering, Business, Economics, and Finance** Vasant, Pandian M., 2012-09-30 Optimization techniques have developed into a significant area concerning industrial economics business and financial systems With the development of engineering and financial systems modern optimization has played an important role in service centered operations and as such has attracted more attention to this field Meta heuristic hybrid optimization is a newly development mathematical framework based optimization technique Designed by logicians engineers analysts and many more this technique aims to study the complexity of algorithms and problems Meta Heuristics Optimization Algorithms in Engineering Business Economics and Finance explores the emerging study of meta heuristics optimization algorithms and methods and their role in innovated real world practical applications This book is a collection of research on the areas of meta heuristics optimization algorithms in engineering business economics and finance and aims to be a comprehensive reference for decision makers managers engineers researchers scientists financiers and economists as well as industrialists



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