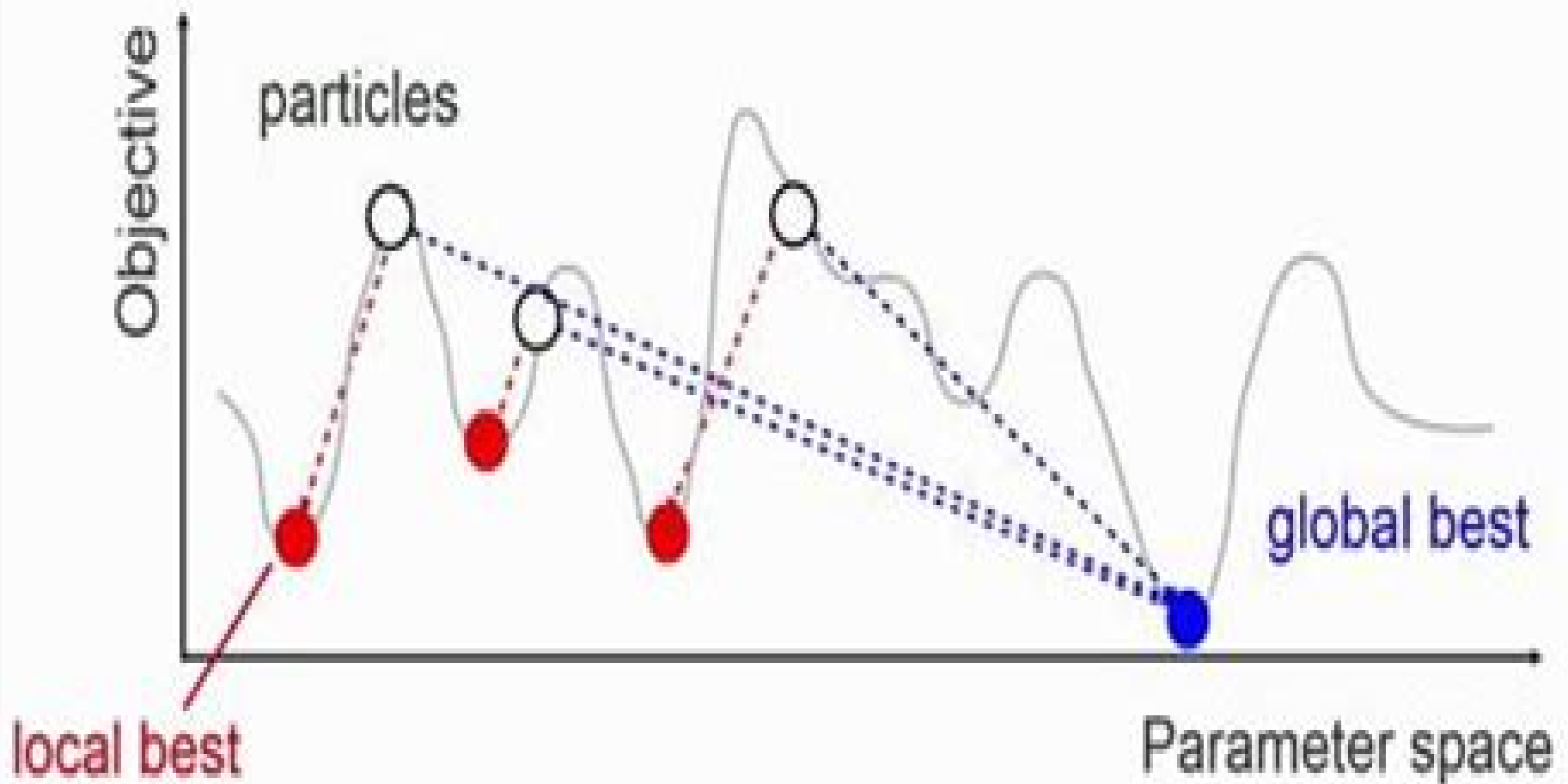


Particle Swarm Optimization



Particle Swarm Optimization

Pakize Erdogmus



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Particle Swarm Optimization Andrea E. Olsson, 2011 Particle swarm optimisation PSO is an algorithm modelled on swarm intelligence that finds a solution to an optimisation problem in a search space or model and predicts social behaviour in the presence of objectives The PSO is a stochastic population based computer algorithm modelled on swarm intelligence Swarm intelligence is based on social psychological principles and provides insights into social behaviour as well as contributing to engineering applications This book presents information on particle swarm optimisation such as using mono objective and multi objective particle swarm optimisation for the tuning of process control laws convergence issues in particle swarm optimisation study on vehicle routing problems using enhanced particle swarm optimisation and others

Particle Swarm Optimisation Jun Sun, Choi-Hong Lai, Xiao-Jun Wu, 2016-04-19 Although the particle swarm optimisation PSO algorithm requires relatively few parameters and is computationally simple and easy to implement it is not a globally convergent algorithm In Particle Swarm Optimisation Classical and Quantum Perspectives the authors introduce their concept of quantum behaved particles inspired by quantum mechanics which leads to the quantum behaved particle swarm optimisation QPSO algorithm This globally convergent algorithm has fewer parameters a faster convergence rate and stronger searchability for complex problems The book presents the concepts of optimisation problems as well as random search methods for optimisation before discussing the principles of the PSO algorithm Examples illustrate how the PSO algorithm solves optimisation problems The authors also analyse the reasons behind the shortcomings of the PSO algorithm Moving on to the QPSO algorithm the authors give a thorough overview of the literature on QPSO describe the fundamental model for the QPSO algorithm and explore applications of the algorithm to solve typical optimisation problems They also discuss some advanced theoretical topics including the behaviour of individual particles global convergence computational complexity convergence rate and parameter selection The text closes with coverage of several real world applications including inverse problems optimal design of digital filters economic dispatch problems biological multiple sequence alignment and image processing MATLAB Fortran and C source codes for the main algorithms are provided on an accompanying downloadable resources Helping you numerically solve optimisation problems this book focuses on the fundamental principles and applications of PSO and QPSO algorithms It not only explains how to use the algorithms but also covers advanced topics that establish the groundwork for understanding

Particle Swarm Optimization and Intelligence: Advances and Applications Parsopoulos, Konstantinos E., Vrahatis, Michael

N.,2010-01-31 This book presents the most recent and established developments of Particle swarm optimization PSO within a unified framework by noted researchers in the field Provided by publisher **Particle Swarm Optimization with Applications** Pakize Erdogmus,2018-05-30 This book is intended to gather recent studies on particle swarm optimization PSO In this book readers can find the recent theoretical developments and applications on PSO algorithm From the theoretical aspect PSO has preserved its popularity because of the fast convergence rate and a lot of hybrid algorithms have recently been developed in order to increase the performance of the algorithm At the same time PSO has also been used to solve different kinds of engineering optimization problems In this book a reader can find engineering applications of PSO such as environmental economic dispatch and grid computing *Applying Particle Swarm Optimization* Burcu Adıgüzel Mercangöz,2021-05-13 This book explains the theoretical structure of particle swarm optimization PSO and focuses on the application of PSO to portfolio optimization problems The general goal of portfolio optimization is to find a solution that provides the highest expected return at each level of portfolio risk According to H Markowitz s portfolio selection theory as new assets are added to an investment portfolio the total risk of the portfolio s decreases depending on the correlations of asset returns while the expected return on the portfolio represents the weighted average of the expected returns for each asset The book explains PSO in detail and demonstrates how to implement Markowitz s portfolio optimization approach using PSO In addition it expands on the Markowitz model and seeks to improve the solution finding process with the aid of various algorithms In short the book provides researchers teachers engineers managers and practitioners with many tools they need to apply the PSO technique to portfolio optimization *Particle Swarm Optimization (PSO)* Brian Walker,2017 Particle swarm optimisation PSO is one of the recently developed swarm intelligent optimisation technologies that offer the advantages of simplicity and fast biological convergence The technique originated from the theory of artificial life and evolution which is based on the optimisation that is achieved as a result of swarm behaviour PSO can be easily implemented due to fewer parameters for adjustment hence it has been applied broadly in various engineering fields This book reviews advances in research and applications of PSO **Nature-Inspired Optimization Algorithms** Xin-She Yang,2014-02-17 Nature Inspired Optimization Algorithms provides a systematic introduction to all major nature inspired algorithms for optimization The book s unified approach balancing algorithm introduction theoretical background and practical implementation complements extensive literature with well chosen case studies to illustrate how these algorithms work Topics include particle swarm optimization ant and bee algorithms simulated annealing cuckoo search firefly algorithm bat algorithm flower algorithm harmony search algorithm analysis constraint handling hybrid methods parameter tuning and control as well as multi objective optimization This book can serve as an introductory book for graduates doctoral students and lecturers in computer science engineering and natural sciences It can also serve a source of inspiration for new applications Researchers and engineers as well as experienced experts will also find it a handy reference Discusses and

summarizes the latest developments in nature inspired algorithms with comprehensive timely literature Provides a theoretical understanding as well as practical implementation hints Provides a step by step introduction to each algorithm

Multidimensional Particle Swarm Optimization for Machine Learning and Pattern Recognition Serkan Kiranyaz, Turker Ince, Moncef Gabbouj, 2015-08-08 For many engineering problems we require optimization processes with dynamic adaptation as we aim to establish the dimension of the search space where the optimum solution resides and develop robust techniques to avoid the local optima usually associated with multimodal problems This book explores multidimensional particle swarm optimization a technique developed by the authors that addresses these requirements in a well defined algorithmic approach After an introduction to the key optimization techniques the authors introduce their unified framework and demonstrate its advantages in challenging application domains focusing on the state of the art of multidimensional extensions such as global convergence in particle swarm optimization dynamic data clustering evolutionary neural networks biomedical applications and personalized ECG classification content based image classification and retrieval and evolutionary feature synthesis The content is characterized by strong practical considerations and the book is supported with fully documented source code for all applications presented as well as many sample datasets The book will be of benefit to researchers and practitioners working in the areas of machine intelligence signal processing pattern recognition and data mining or using principles from these areas in their application domains It may also be used as a reference text for graduate courses on swarm optimization data clustering and classification content based multimedia search and biomedical signal processing applications

Computational Intelligence Andries P. Engelbrecht, 2007-10-22 Computational Intelligence An Introduction Second Edition offers an in depth exploration into the adaptive mechanisms that enable intelligent behaviour in complex and changing environments The main focus of this text is centred on the computational modelling of biological and natural intelligent systems encompassing swarm intelligence fuzzy systems artificial neural networks artificial immune systems and evolutionary computation Engelbrecht provides readers with a wide knowledge of Computational Intelligence CI paradigms and algorithms inviting readers to implement and problem solve real world complex problems within the CI development framework This implementation framework will enable readers to tackle new problems without any difficulty through a single Java class as part of the CI library Key features of this second edition include A tutorial hands on based presentation of the material State of the art coverage of the most recent developments in computational intelligence with more elaborate discussions on intelligence and artificial intelligence AI New discussion of Darwinian evolution versus Lamarckian evolution also including swarm robotics hybrid systems and artificial immune systems A section on how to perform empirical studies topics including statistical analysis of stochastic algorithms and an open source library of CI algorithms Tables illustrations graphs examples assignments Java code implementing the algorithms and a complete CI implementation and experimental framework Computational Intelligence An Introduction Second Edition is essential reading

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Particle Swarm Optimizaton Said M. Mikki, Ahmed A. Kishk, 2008-08-08 This work aims to provide new introduction to the particle swarm optimization methods using a formal analogy with physical systems By postulating that the swarm motion behaves similar to both classical and quantum particles we establish a direct connection between what are usually assumed to be separate fields of study optimization and physics Within this framework it becomes quite natural to derive the recently introduced quantum PSO algorithm from the Hamiltonian or the Lagrangian of the dynamical system The physical theory of the PSO is used to suggest some improvements in the algorithm itself like temperature acceleration techniques and the periodic boundary condition At the end we provide a panorama of applications demonstrating the power of the PSO classical and quantum in handling difficult engineering problems The goal of this work is to provide a general multi disciplinary view on various topics in physics mathematics and engineering by illustrating their interdependence within the unified framework of the swarm dynamics Table of Contents Introduction The Classical Particle Swarm Optimization Method Boundary Conditions for the PSO Method The Quantum Particle Swarm Optimization Bibliography Index

Swarm Intelligence , 2019-12-04 Swarm Intelligence has emerged as one of the most studied artificial intelligence branches during the last decade constituting the fastest growing stream in the bio inspired computation community A clear trend can be deduced analyzing some of the most renowned scientific databases available showing that the interest aroused by this branch has increased at a notable pace in the last years This book describes the prominent theories and recent developments of Swarm Intelligence methods and their application in all fields covered by engineering This book unleashes a great opportunity for researchers lecturers and practitioners interested in Swarm Intelligence optimization problems and artificial intelligence

Advances of Computational Intelligence in Industrial Systems Ying Liu, Aixin Sun, Han Tong Loh, Wen Feng Lu, Ee-Peng Lim, 2010-10-28 Computational Intelligence CI has emerged as a rapidly growing field over the past decade This volume reports the exploration of CI frontiers with an emphasis on a broad spectrum of real world applications Such a collection of chapters has presented the state of the art of CI applications in industry and will be an essential resource for

professionals and researchers who wish to learn and spot the opportunities in applying CI techniques to their particular problems

Handbook of Swarm Intelligence Bijaya Ketan Panigrahi, Yuhui Shi, Meng-Hiot Lim, 2011-02-04 From nature we observe swarming behavior in the form of ant colonies bird flocking animal herding honey bees swarming of bacteria and many more It is only in recent years that researchers have taken notice of such natural swarming systems as culmination of some form of innate collective intelligence albeit swarm intelligence SI a metaphor that inspires a myriad of computational problem solving techniques In computational intelligence swarm like algorithms have been successfully applied to solve many real world problems in engineering and sciences This handbook volume serves as a useful foundational as well as consolidatory state of art collection of articles in the field from various researchers around the globe It has a rich collection of contributions pertaining to the theoretical and empirical study of single and multi objective variants of swarm intelligence based algorithms like particle swarm optimization PSO ant colony optimization ACO bacterial foraging optimization algorithm BFOA honey bee social foraging algorithms and harmony search HS With chapters describing various applications of SI techniques in real world engineering problems this handbook can be a valuable resource for researchers and practitioners giving an in depth flavor of what SI is capable of achieving

An Introduction to Metaheuristics for Optimization Bastien Chopard, Marco Tomassini, 2018-11-02 The authors stress the relative simplicity efficiency flexibility of use and suitability of various approaches used to solve difficult optimization problems The authors are experienced interdisciplinary lecturers and researchers and in their explanations they demonstrate many shared foundational concepts among the key methodologies This textbook is a suitable introduction for undergraduate and graduate students researchers and professionals in computer science engineering and logistics

Particle Swarm Optimization Said M. Mikki / Ahmed A. Kishk, 2008

Advances in Particle Swarm Optimization May Church, 2021-11-16 Particle swarm optimization can be defined as a computational method that is used to optimize a problem by iteratively trying to improve a candidate solution with respect to a given measure of quality It is deployed to solve a problem by having a population of candidate solutions and moving them around in the search space in accordance with simple mathematical formulae over the particle's position and velocity Particle swarm optimization can search very large spaces of candidate solutions because it is metaheuristic and does not make any assumptions about the problem being optimized There are various variants of particle swarm optimization such as hybridization simplifications multi objective optimization and binary discrete and combinatorial particle swarm optimization This book elucidates the concepts and innovative models around prospective developments in relation to particle swarm optimization Different approaches evaluations methodologies and advanced studies on this topic have been included in it This book will serve as a reference to a broad spectrum of readers

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