

Sima Noghanian - Abas Sabouni  
Travis Desell - Ali Ashtari

# Microwave Tomography

Global Optimization, Parallelization and  
Performance Evaluation



Springer

# Microwave Tomography Global Optimization Parallelization And Performance Evaluation

**Xudong Chen**

## **Microwave Tomography Global Optimization Parallelization And Performance Evaluation:**

**Microwave Tomography** Sima Noghanian,Abas Sabouni,Travis Desell,Ali Ashtari,2014-07-08 This book provides a detailed overview on the use of global optimization and parallel computing in microwave tomography techniques The book focuses on techniques that are based on global optimization and electromagnetic numerical methods The authors provide parallelization techniques on homogeneous and heterogeneous computing architectures on high performance and general purpose futuristic computers The book also discusses the multi level optimization technique hybrid genetic algorithm and its application in breast cancer imaging

**Computational Methods for Electromagnetic Inverse Scattering** Xudong Chen,2018-03-20 A comprehensive and updated overview of the theory algorithms and applications of for electromagnetic inverse scattering problems Offers the recent and most important advances in inverse scattering grounded in fundamental theory algorithms and practical engineering applications Covers the latest most relevant inverse scattering techniques like signal subspace methods time reversal linear sampling qualitative methods compressive sensing and noniterative methods Emphasizes theory mathematical derivation and physical insights of various inverse scattering problems Written by a leading expert in the field

*Parameter Estimation of Nonlinear Random Medium by Scattered Electromagnetic Fields* Manisha Khulbe,Harish Parthasarathy,2023-10-16 This book is on the nonlinear random medium analysis that includes subtopics of terahertz imaging inverse scattering plasmonics quantum optics communication laser modes and terahertz photonic antennas Here in this book a mathematical framework is developed to analyze the impact of dimensions and chemical potential on nano antenna channels

Scientific and Technical Aerospace Reports ,1992 **Computer & Control Abstracts** ,1996 Government Reports Announcements & Index ,1996-07 **Aeronautical Engineering** ,1993 A selection of annotated references to unclassified reports and journal articles that were introduced into the NASA scientific and technical information system and announced in Scientific and technical aerospace reports STAR and International aerospace abstracts IAA Electrical & Electronics Abstracts ,1997 *Aeronautical Engineering: A Cumulative Index to a Continuing Bibliography (supplement 287)* ,1993 Dissertation Abstracts International ,1990 The Engineering Index Annual ,1992 Since its creation in 1884 Engineering Index has covered virtually every major engineering innovation from around the world It serves as the historical record of virtually every major engineering innovation of the 20th century Recent content is a vital resource for current awareness new production information technological forecasting and competitive intelligence The world s most comprehensive interdisciplinary engineering database Engineering Index contains over 10 7 million records Each year over 500 000 new abstracts are added from over 5 000 scholarly journals trade magazines and conference proceedings Coverage spans over 175 engineering disciplines from over 80 countries Updated weekly NASA SP. ,1991 **International Aerospace Abstracts** ,1999 Government reports annual index ,199? A Study of Global Optimization for Microwave Tomography ,2007 *Microwave Tomography Using Stochastic Optimization and High*

Performance Computing Michael William Holman,2013

## **Parallel Global Optimization with the Particle Swarm**

**Algorithm (Preprint).** ,2004 Present day engineering optimization problems often impose large computational demands resulting in long solution times even on a modern high end processor To obtain enhanced computational throughput and global search capability we detail the coarse grained parallelization of an increasingly popular global search method the Particle Swarm Optimization PSO algorithm Parallel PSO performance was evaluated using two categories of optimization problems possessing multiple local minima large scale analytical test problems with computationally cheap function evaluations and medium scale biomechanical system identification problems with computationally expensive function evaluations For load balanced analytical test problems formulated using 128 design variables speedup was close to ideal and parallel efficiency above 95% for up to 32 nodes on a Beowulf cluster In contrast for load imbalanced biomechanical system identification problems with 12 design variables speedup plateaued and parallel efficiency decreased almost linearly with increasing number of nodes The primary factor affecting parallel performance was the synchronization requirement of the parallel algorithm which dictated that each iteration must wait for completion of the slowest fitness evaluation When the analytical problems were solved using a fixed number of swarm iterations a single population of 128 particles produced a better convergence rate than did multiple independent runs performed using sub populations 8 runs with 16 particles 4 runs with 32 particles or 2 runs with 64 particles These results suggest that 1 parallel PSO exhibits excellent parallel performance under load balanced conditions 2 an asynchronous implementation would be valuable for real life problems subject to load imbalance and 3 larger population sizes should be considered when multiple processors are available

## **Performance**

**Evaluation of Parallel Projection Computerized-tomography** Nicolas J. Dusaussoy,1986

## **Global Optimization for**

**Microwave Device Parameter Extraction** Paul Anthony Linden,1992

Ultra-WideBand (UWB) Microwave Tomography

Using Full-wave Analysis Techniques for Heterogeneous and Dispersive Media Abas Sabouni,2011

Microwave imaging  
Microwave tomography Breast cancer detection finite difference time domain Genetic algorithm Global optimization Breast imaging Frequency dependence finite difference time domain Real genetic algorithm Binary genetic algorithm Hybrid genetic algorithm Maxwell s equations Inverse scattering problem

## The Enigmatic Realm of **Microwave Tomography Global Optimization Parallelization And Performance Evaluation**: Unleashing the Language is Inner Magic

In a fast-paced digital era where connections and knowledge intertwine, the enigmatic realm of language reveals its inherent magic. Its capacity to stir emotions, ignite contemplation, and catalyze profound transformations is nothing lacking extraordinary. Within the captivating pages of **Microwave Tomography Global Optimization Parallelization And Performance Evaluation** a literary masterpiece penned by way of a renowned author, readers attempt a transformative journey, unlocking the secrets and untapped potential embedded within each word. In this evaluation, we shall explore the book's core themes, assess its distinct writing style, and delve into its lasting impact on the hearts and minds of those that partake in its reading experience.

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