CP01

The Study of a Drift-Diffusion Non-Linear Model by Using the Shape Optimization

We present a study of a drift-diffusion non-linear model by using the shape optimization.The model that we consider in this work is the coupled system formed by the Laplace-Poisson equations and the continuity equation. In this model, the among of the unknown is a free boundary wich separates the depletion region and the neutrality of load region. We formulete this model as an optimization problem. We prove the existence of the free boundary and of the shape gradient. We give also one algorithme used to compute the frontier.This algorithme is tested and compareted to the existent algorithms using other technics.

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CP01

Nonsequential Dynamic Programming for Optimizing Pipelines

Approximately two billion dollars worth of natural gas is used yearly in the US just to power the transmission of the remaining natural gas production through pipelines to market. We show an elegant optimization algorithm for minimizing compressor fuel on detailed nonlinear simulations of branched and looped pipelines. It is up to 40 times faster than earlier, inexact, hybrid methods.

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CP01

Network Models and Interdisciplinary Analysis of Spacecraft Thermal Systems

The thermal network approach is a widely used discretization method for modeling spacecraft thermal systems. These systems are frequently dominated by radiative transfer, which introduces quartic nonlinearities in the network equations. Although these systems are routinely encountered, there has not appeared any detailed analysis of these equations. In this talk general existence and uniqueness properties of the network equations are established, and the role of globally convergent solution methods in interdisciplinary applications are discussed. An application to the optomechanical modeling and design of a large space based optical interferometer is presented.

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CP01

Predicting Protein Tertiary Structure using a Global Optimization Algorithm with Smoothing

We present a global optimization algorithm and demonstrate its effectiveness in solving the protein structure prediction problem for larger proteins than solved by global optimization previously. Our approach combines techniques which "smooth" the potential energy surface being minimized with methods that do a global search in selected subspaces of the problem in addition to locally minimizing in the full parameter space. Neural network predictions of secondary structure are used in the formation of initial structures.

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CP01

Inverse Modeling of Semiconductor Devices

We present the inverse modeling of semiconductor devices based on their electrical characteristics. This method gives accurate information about the two-dimensional distribution of dopants. A Levenberg-Marquardt optimizer is utilized to find the doping profile which delivers an optimum match between measurements and the results obtained from a semiconductor device simulator. The general optimization environment SIESTA is used to accomplish this task. It allows parallel computation and time efficient distribution of simulation jobs.

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CP01

A Disjunctive Program for Optimal Hedge Effec-