Michael Bartholomew-Biggs

After a short time in the aircraft industry, Michael Bartholomew-Biggs joined the Numerical Optimisation Centre in Hatfield in 1968 where he worked on the development and application of algorithms for nonlinear optimization. He is still part of the NOC but since 1990 he has also been Reader on Computational Mathematics at the University of Hertfordshire. He was awarded the George Taylor prize of the Royal Aeronautical Society in 1990 and has been a visiting lecturer at Bergamo University since 2000. He held an Erskine Fellowship at the University of Canterbury, New Zealand during 2008.

He has published many research papers in the technical literature and his most recent books are **"Nonlinear Optimization with Financial Applications"** (Kluwer 2004) and **"Nonlinear Optimization with Engineering Applications"** (Springer 2008).

NSOS – Nonlinear Systems Optimization and Statistics

Algoritmi R&D Centre
University of Minho

Adventures in Global Optimization

Michael Bartholomew-Biggs

September 19, 2008
15h00-16h00 & 16h30-17h30
ANF, EE II
Campus de Gualtar
4710-057 Braga

Adventures in Global Optimization

Michael Bartholomew-Biggs

Numerical Optimisation Centre
School of Physics Astronomy and Mathematics
University of Hertfordshire
England

This talk draws on a range of projects in the last few years in which global optimization techniques have been applied to practical problems in science, engineering and business. We focus on two particular (but very different) applications - a particle identification problem arising in physics and a technique for financial portfolio selection.

In the first part of the talk we describe a method for particle identification based on light-scattering and show that it admits many false solutions. We then describe the Rinooy-Kan multi-start approach and the DIRECT algorithm given by Jones and show how these, when combined with a reformulation of the problem, can be used to isolate the true solution.

The second part of the talk introduces the omega function proposed by Shadwick and Cascon as a measure of financial asset performance. We show how this can be used as a basis for portfolio optimization and observe that this leads to a problem with multiple minima. We give some example solutions using the MCS algorithm implemented in the NAG library and make comparisons with portfolios produced using classical Markowitz ideas.

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