综合报告会

Lecture

国家数学与交叉科学中心

Time: 3:30-4:30 pm, November 4

Venue: Hall

A parsimonious way of constructing quadratic models from values of the objective function in derivative-free optimization

Speaker: Michael J.D. Powell

University of Cambridge

Abstract:

In this talk, we consider the so-called derivative-free optimization problems in which we minimize a function without the information of its first order derivatives. We attack this problem by constructing a trust region model based on interpolation. First we consider the linear model which is constructed by interpolating the objective function at n+1 points on each iteration. An algorithm of this kind is described briefly with a convergence theorem. Then we present a technique in which we can construct a quadratic model by using only n+1 interpolation points on each iteration as well. Experiments demonstrate that this technique for constructing quadratic models provides major improvements over the use of linear models, both in the total number of function evaluations and in the final accuracy of the optimization calculation.

Brief CV:

Prof. Michael James David Powell from Cambridge University is a fellow of the Royal Society, and also a founding member of the Institute of Mathematics and its Applications and a founding Managing Editor of the Journal for Numerical Analysis. He is well known for his extensive work in numerical analysis, especially nonlinear optimization and approximation. He was the winner of many awards, including George B. Dantzig Prize from the Mathematical Programming Society/SIAM and the Naylor Prize from the London Mathematical Society.

His mathematical contributions include quasi-Newton methods, particularly the Davidon-Fletcher-Powell formula and the Powell's Symmetric Broyden formula, augmented Lagrangian function (also called Powell-Rockafellar penalty function), sequential quadratic programming method (also called as Wilson-Han-Powell method), trust region algorithms, conjugate direction method (also called Powell's method), and radial basis function. He is the author of numerous scientific papers and of several books, most notably approximation theory and methods.