Editorial

Axel Ruhe

Published online: 9 September 2010
© Springer Science + Business Media B.V. 2010

BIT 50

Our journal BIT has now reached the venerable age of 50 ! This was celebrated by a scientific conference in Lund, Sweden, the birthplace of BIT, on June 17–20, 2010.

Åke Björck and Germund Dahlquist at their common birthday celebration Jan 15 2005. Photo Gunlaug Östbye

A. Ruhe (✉)
Department of Numerical Analysis and Computer Science, NADA, Royal Institute of Technology
KTH, 10044 Stockholm, Sweden
e-mail: ruhe@nada.kth.se

An excursion and dinner at Louisiana, Denmark, was included. It is a contemporary art museum at the beach of Öresund, the narrow and busy water separating Sweden and Denmark. This was the occasion to announce the promotion of *Åke Björck* to Honorary Editor as a recognition for his long term of service to BIT. It started when publishing his epoch making thesis about Gram Schmidt orthogonalization of vectors in BIT 7 in 1967. It continued when he became Area Editor for Numerical Analysis in 1980, and Editor in Chief of BIT, Numerical Mathematics, 1992–2002. During Åke's tenure, BIT left its youth as a home grown operation, started in enthusiasm and optimism by *Carl Eric Fröberg* and became the well established and recognized journal you now can see, one of the primary publication channels for Numerical Mathematics.

The first BIT issue 2011 will be a special issue devoted to a choice of contributions from the BIT50 conference.

Introduction to the contents of the issue BIT 50:3

This issue of BIT continues our tradition in finding numerical methods to solve time dependent problems and developing and analyzing accuracy and stability of stepping forward, but we also have some contributions to approximation of functions and computations using linear algebra.

In the first paper, *Winfried Auzinger* and *Felix Kramer* study the errors of linear multistep methods applied to a linear evolution system. A 2-step backward differentiation scheme is considered in particular detail. An asymptotic error expansion is derived, based on damping properties of the scheme. In another paper, *María López-Fernández* develops an exponential method for time integration of stiff semilinear problems using a quadrature formula to approximate the exponential operator.

Two papers deal with stochastic differential equations, SDE. *H. De la Cruz Cancino*, *R. J. Biscay*, *J. C. Jimenez*, *F. Carbonell* and *T. Ozaki* describe a High Order Local Linearization method for an SDE. It involves the solution of a linear ordinary differential equation by an A-stable local linearization method plus the solution of an auxiliary SDE. *Kristian Debrabant* describes a new third order Runge Kutta method for weak solution of an SDE with multidimensional additive noise. It involves fewer random function evaluations than previously known schemes, and its performance is compared to known methods on a few specially designed experiments.

We have two papers studying finite element methods, FEM. In the first one, *Karin Kraft* and *Stig Larsson* study optimal control of a system of ordinary differential equations. The error estimate is based on an a posteriori estimate of a finite element discretization in the time direction. An application to vehicle dynamics is reported. In the second, *JaEun Ku* gives highly localized pointwise error estimates for a stabilized Galerkin FEM method for a non selfadjoint stationary problem. The stabilization terms added to the standard Galerkin method guarantee the existence and uniqueness of the approximate solution regardless of mesh size.

In another paper, *André Nagamine* and *José Alberto Cuminato* solve a singular integro differential equation by first reformulating it as an integral equation and then doing a collocation on Chebyshev points. They compare their method to several existing schemes on a carefully chosen set of test examples.

Marco Donatelli studies algorithms for deconvolution of signals. An appropriate choice of functional basis increases the precision, without making the linear algebra computations heavier.

Michael Floater derives a chain rule for computing divided differences of a function of two variables. It resembles the chain rule for differentiation and is useful for error analysis of parametric curve interpolation.

Fermín S. Viloche Bazán and *Leonardo S. Borges* solve a discrete ill posed problem by Golub Kahan bidiagonalization followed by Tikhonov regularization of the bidiagonal system. A fixed point iteration is used to find a good value of the regularization parameter and the result of this regularization determines at which step to stop the bidiagonalization.

A pleasant and beneficial read wishes you,

A handwritten signature in black ink, reading "Axel Ruhe". The signature is fluid and cursive, with a long horizontal stroke at the end.

Axel Ruhe