Introduction to the contents of issue 51:2

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After the special issue 51:1, devoted to the BIT50 conference held 17–20 June 2010 in Lund, Sweden, this is a regular issue, where some of the contributions have an earlier origin. Let me present the contents:

Jeffrey M. Connors and Attou Miloua describe a decoupling technique for parallel solution of large ODE systems. It allows different time steps in different parts, which gives a chance to follow the system for a long time without an excessive amount of computation.

Ronald Cools and Koen Poppe introduce the concept of Chebyshev lattice for numerical cubature. This covers several two and three dimensional point sets that have been discussed previously, and gives a Clenshaw-Curtis like scheme for multiple dimensional integrals.

Kaushik Mukherjee and Srinivasan Natesan treat a singularly perturbed parabolic convection diffusion problem, exhibiting strong interior layers, with an upwind finite difference scheme. It is shown that it converges uniformly in a discrete supremum norm.

Eugene O’Riordan and Jason Quinn use parameter-uniform numerical methods composed of monotone finite difference operators and piecewise-uniform Shishkin meshes. They obtain parameter uniform error bounds.

Tomoaki Okayama, Takayasu Matsuo and Masaaki Sugihara describe a new sinc collocation method for a Fredholm integral equation of the second kind. It is proved to converge exponentially. A double exponential transformation improves the convergence rate, compared to the tanh transformation used traditionally.

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Siegfried M. Rump compares some verified bound for the singular values of a matrix. They are used to get rigorous error bounds for the numerical solution of a two point boundary value problem of a system of linear differential equations.

Jennifer Scott and *Miroslav Tůma* treat incomplete factorization preconditioners, where the number of levels of fill in is determined by the size of the matrix elements. This gives a more predictable amount of fill in than simple drop tolerance and fewer iterations than straightforward incomplete factorizations.

Lukasz Szpruch, *Xuerong Mao*, *Desmond J Higham* and *Jiazhu Pan* study Euler-Maruyama type approximations to the solution of a class of stochastic differential equations models with highly nonlinear coefficients, arising in mathematical finance. They show that an appropriate implicit numerical method preserves positivity and boundedness of moments, and converges strongly to the true solution.

J.G. Verwer describes a time integration scheme for semi-discrete Maxwell equations with a component splitting that allows longer time steps than fully explicit schemes.

James Ferris Whidborne and *Nathalie Amar* give a bound for the maximum initial transient growth of the solution of a linear dynamical system. Such growth, usually caused by a highly nonnormal system matrix, make the solution very sensitive to initial perturbations, even for an asymptotically stable system.

Qinghui Zhang studies the role of integration methods for the convergence of meshless Galerkin methods for elliptic systems with Neumann boundary conditions.

Welcome to another issue of BIT!

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