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We start this issue with a thorough contribution to a well studied problem in the numerical treatment of differential equations. In the first paper, *Ben Adcock* describes a spectral-Galerkin method for a two point boundary value problem with homogeneous Neumann boundary conditions. Modified Fourier series are used. In another differential equation paper, *Etienne Emmrich* solves a nonlinear evolution equation by a two step backward differentiation, BDF, formula, where the step is allowed to vary as long as the quotient between two subsequent steps is bounded.

We are happy to include two contributions that deal with how to handle random effects when following a differential system forwards in time. *Matthias Geissert*, *Mihály Kova*, and *Stig Larsson* solve a stochastic heat equation driven by additive noise, with a standard finite element discretization in space. It is shown to give a weak convergence at twice the rate of its strong convergence. In the next paper, *Juan Carlos Jimenez* and *Felix Carbonell* study the convergence of a local linearization method for a random differential system driven by commutative noise. A general theorem giving the order of convergence is given. It is applied to some implementations of local linearization algorithms.

We have also two papers on initial value algorithms tailored to practically important applied problems. *Ujjwal Koley*, *Siddharta Mishra*, *Nils Henrik Risebro*, and *Magnus Svärd* describe high order finite difference methods for the magnetic induction equations. The finite difference schemes are based on summation by parts operators for spatial derivatives and a simultaneous approximation term technique for imposing boundary conditions. *Jörg Wensch*, *Oswald Knoth*, and *Alexander Galant* treat the Euler equations of atmospheric flow. Such a flow contains both fast sound

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waves and much slower convection phenomena. A multirate time integration procedure is applied to a space discretization based on a staggered grid.

We also have a few contributions to more basic computational algorithms that are used to build up mathematical software. *Benjamin F. Bunck* computes values of a nonlinear Hermite function. An algorithm based on numerical contour integration is faster than the traditional three term recurrence.

J.A. Ezquerro and *M.A. Hernández* solve a nonlinear equation in Banach space. A two step method of order four is described. It needs to evaluate only one function, two first derivatives and do one LU factorization in each step.

James Lyness and *James W. Lottes* compute oscillatory integrals by means of asymptotic expansions. Several needed results concerning inverse functions are derived.

Even more basic questions are treated by *Siegfried M. Rump*, *Paul Zimmermann*, *Sylvie Boldo*, and *Guillaume Melquiond*. They give bounds for the closest neighbors of a given floating point number. Such bounds are needed for a practical implementation of interval analysis in floating point arithmetic.

Your editor in chief is happy to have one contribution to his own area, matrix eigenvalues. *Jason Slemons* and *Christof Vömel* develop a twisted factorization of a symmetric banded matrix. This is used in a Multiple Relatively Robust Representations (*MRRR*) algorithm to compute orthogonal eigenvectors, without needing a time consuming reorthogonalization. This computation is so far down in the software hierarchy, and is called so many times with any set of data, that we still see new ingenious algorithmic developments.

Welcome to another issue of BIT!

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