Introduction to the Contents of Issue 49:3

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In this issue, we have happened to get several contributions in the Approximation and Numerical Quadrature area. In the first paper *Rafael Campos* and *Fransisco Meijo Diaz* develop quadrature formulas for discrete two sided Laplace transforms. These formulas give convergent approximations for functions that fall off to zero fast enough. An asymptotic formula yields an algorithm that computes a discrete Laplace transform using only exponentials. In another paper, *Frances Kuo*, *Gregorz Wasilkowski* and *Henryk Woźniakowski* investigate the power of algorithms to compute approximate values of a function in a reproducing Hilbert kernel space. They show that standard information, using n function values at randomly distributed points, is nearly as good as generalized information that uses n values of arbitrary linear functionals. In another paper, *Paula Lamberti* develops cubature formulas based on two dimensional B splines over an irregular triangulation.

Two papers deal with how to find an approximation to a function given at irregularly distributed data points. *A Lamni*, *Hamid Mraoui*, *Dress Sbibi* and *Ahmed Zidna* approximate a function over a sphere by tensor product trigonometric splines or periodic algebraic trigonometric wavelets. The intention is to use such approximations for data compression. *Francesca Mazzia* and *Alessandra Sestini* develop a quasi interpolation scheme based on Hermite B splines of arbitrary degree. A small linear system is solved for each knot. For reasonably distributed knots, it can be used as a collocation method for solving a system of ordinary differential equations.

In two related papers, it is shown how to develop higher order splitting methods for dissipative evolution equations. Complex time steps with positive real parts are used independently by *Francois Castella*, *Philippe Chartier*, *Stéphane Descombes*

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and *Gilles Vilmart* in one paper, and by *Eskil Hansen* and *Alexander Ostermann* in another paper of this issue. This way the instability of negative time steps and the low order barrier for positive time steps are avoided. The error analysis uses the context of analytic semigroups.

Two papers deal with Numerical Linear Algebra problems. In the paper by *Kui Du*, *Graeme Fairweather*, *Que N. Nguyen* and *Weiwei Sun*, fast direct methods based on eigendecompositions are used to solve continuous finite element Galerkin equations, with piecewise quadratic polynomials for elliptic equations over a unit square. In the last paper of this issue, *Silvia Noschese* and *Lothar Reichel* study the properties of banded and normal Toeplitz matrices. They find an expression for the shortest Frobenius norm distance from a banded Toeplitz matrix to a normal matrix of the same structure. In some cases, this structured distance is significantly larger than the distance to an arbitrary normal matrix.

Welcome to another issue of BIT!

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