

Editorial

Approximation Theory and Numerical Analysis

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Approximation Theory and Numerical Analysis are closely related areas of mathematics. Approximation Theory lies in the crossroads of pure and applied mathematics. It includes a wide spectrum of areas ranging from abstract problems in real, complex, and functional analysis to direct applications in engineering and industry. Therefore, Approximation Theory employs a great variety of methods, which originate in analysis, operator theory, harmonic analysis, quantum calculus, algorithms, probability theory, and further areas of mathematics.

This special issue was launched in November 2013 aiming at bringing out new developments in these subjects with main focus on the interaction between Approximation Theory and Numerical Analysis. All papers submitted to the issue have been refereed by experts in their respective fields and examined by the academic editors. Thoroughly selected papers falling into the scope of the issue have been published, and hopefully they will be of interest for the reader.

The issue contains a number of papers related to the Bernstein type operators based on the q -integers. After q -analogues of the Bernstein polynomials had been introduced by A. Lupaş in 1987 and G. Phillips in 1997, the study of various q -analogues of the classical operators became an area of intensive research. The present special issue supplies a selection of papers on the q -operators including those written by well-known specialists in the area such as N. I. Mahmudov, H. Wang, and X. Wu. In those works, distinct modifications of the q -Bernstein polynomials have been studied, for example, q -Bernstein-Durrmeyer polynomials, q -Lupaş operator, q -Szász-Mirakjan operator, and truncated q -Bernstein polynomials. The authors deal with the convergence of the operators,

both in real and complex cases, shape-preserving properties, and discuss possible generalizations of the classical results. Moreover, the paper by X. Wu presents a complete solution to the long-standing open problem on the approximation of all continuous functions on $[0, 1]$ by the q -Bernstein polynomials in the case $q \rightarrow 1^+$.

Furthermore, the issue includes a paper on inequalities for real functions. To be specific, the subject of the paper of A. Qayyum et al. is Ostrowski type inequalities, that is, inequalities giving bounds for the deviation of a function from its integral mean. The authors obtain bounds for the deviation of a function from a combination of integral means over two subintervals covering the entire interval in terms of the L_p -norms of the second derivative of the function, $1 \leq p \leq \infty$.

The issue contains a paper on the bivariate interpolation and some related topics. Particularly, the paper by L. Zou and S. Tang studies the interpolation theorem, algorithms, and dual interpolation. It also provides many kinds of interpolation schemes.

A classical topic—solution of nonlinear equations—is also represented in the issue. F. Dubeau's paper is devoted to studying Schröder's processes which are fixed point processes for finding simple roots of nonlinear equations. The author shows that Schröder's processes of the first kind and of the second kind are related by polynomial and rational approximations, thus giving an answer to a question raised by M. Petković to find and explain a possible link between the two processes.

The papers outlined below regard the area of Numerical Analysis. The first deals with $LM - g$ splines. $LM - g$ splines