Editorial

Applications of Methods of Numerical Linear Algebra in Engineering 2016

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Methods of numerical linear algebra are concerned with the theory and practical aspects of computing solutions of mathematical problems in engineering such as image and signal processing, telecommunication, data mining, computational finance, bioinformatics, optimization, and partial differential equations. In recent years, applications of methods of numerical linear algebra in engineering have received a lot of attention and a large number of papers have proposed several methods for solving engineering problems. This special issue is devoted to publishing the latest and significant methods of numerical linear algebra for computing solutions of engineering problems.

We received thirty-two papers in the interdisciplinary research fields. This special issue includes eight high quality peer-reviewed articles.

In the following, we briefly review each of the papers that are published.

(1) In the paper entitled “Application of the Least Squares Method in Axisymmetric Biharmonic Problems” V. Chekurin and L. Postolaki develop an approach for solving the axisymmetric biharmonic boundary value problems for semi-infinite cylindrical domain.

(2) In the paper entitled “Explicit Determinantal Representation Formulas of W -Weighted Drazin Inverse Solutions of Some Matrix Equations over the Quaternion Skew Field” I. I. Kyrchei obtains explicit formulas for determinantal representations of the W -weighted Drazin inverse solutions (analog of Cramer’s rule) of the quaternion matrix equations.

(3) In the paper entitled “A General Solution to Least Squares Problems with Box Constraints and Its Applications”

Y. Teng et al. introduce a flexible solution to the box-constrained least squares problems. This solution is applicable to many existing problems, such as nonnegative matrix factorization, support vector machine, signal deconvolution, and computed tomography reconstruction.

(4) In the paper entitled “A Novel Control Strategy of DFIG Based on the Optimization of Transfer Trajectory at Operation Points in the Islanded Power System” Z. Mi et al. propose a novel control strategy based on the optimization of transfer trajectory at operation points for DFIG.

(5) In the paper entitled “A Joint Scheduling Optimization Model for Wind Power and Energy Storage Systems considering Carbon Emissions Trading and Demand Response” Y. Aiwei et al. introduce energy storage systems (ESSs) and demand response (DR) to the traditional scheduling model of wind power and thermal power with carbon emission trading (CET).

(6) In the paper entitled “Parallelization of Eigenvalue-Based Dimensional Reductions via Homotopy Continuation” S. Bi et al. investigate a homotopy-based method for embedding with hundreds of thousands of data items which yields a parallel algorithm suitable for running on a distributed system.

(7) In the paper entitled “Application of the Value Optimization Model of Key Factors Based on DSEM” C. Su and Z. Ren establish a value optimization model of key factors to control the simulation accuracy and computational efficiency of the soil-structure interaction.

(8) In the paper entitled “Computing the Pseudoinverse of Specific Toeplitz Matrices Using Rank-One Updates” P.

S. Stanimirović et al. present application of the pure rank-one update algorithm as well as a combination of rank-one updates and the Sherman-Morrison formula in computing the Moore-Penrose inverse of the particular Toeplitz matrix.

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