

Editorial

Recent Trends in Boundary Value Problems

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The subject of boundary value problems has a long and enriched history ranging from its theoretical (existence and uniqueness of solutions) development to the methods and techniques of finding or approximating their solutions. Boundary value problems arise naturally in a variety of applied fields and can be categorized as well posed and ill posed, local and nonlocal, linear and nonlinear, singular and nonsingular, and free and fixed problems. Ordinary, partial, functional, fractional, and integrodifferential equations together with the boundary data varying from two-point and periodic to multipoint and nonlocal boundary conditions constitute interesting and important classes of boundary value problems.

This special issue focuses on new and recent developments on the theory, methods, and applications of boundary value problems and, as requested in the call for papers, contains papers on

- (i) existence and uniqueness of solutions;
- (ii) analytical methods;
- (iii) iterative methods;
- (iv) perturbation techniques;
- (v) numerical techniques;
- (vi) applications in physical sciences;
- (vii) applications in engineering, biology, and medicine;
- (viii) applications in economics and social sciences.

It includes papers on different aspects such as new classes of boundary value conditions for fractional differential equations, singular differential equations, controllability of partial differential equations, bifurcation of positive solutions, impulsive problems, inverse problems, numerical methods using, for example, recursively compressed inverse preconditioning, finite element method, or hybrid topological derivative-gradient-based methods. It also includes applications to fields such as Langevin differential inclusions, Cahn-Hilliard equations, structural shape optimization, or brain stroke detection and contributors from many different countries (China, Colombia, Germany, Greece, Iran, Romania, Spain, Saudi Arabia, South Africa, Sweden, Turkey, and USA).

Evidently, it is not possible to adequately represent in this special issue all directions of current research on boundary value problems, but we believe that it reflects both theoretical research and important recent advances including current challenging problems, new ideas, and open problems.

Acknowledgments

We, the Guest Editors of this special issue, would like to express our gratitude to the authors for their contributions which made it possible to have a very stimulating interchange of ideas. We are also thankful to the individuals who served as referees for the submitted papers. We hope that the topics covered in this special issue will stimulate future research.