Special Issue on
Recent Advances in the Application of Differential Equations in Mechanical Engineering Problems

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Differential equations arising in mechanics, physics, engineering, biological sciences, economics, and other fields of sciences may be classified into either linear or nonlinear formulated as initial or boundary value problems. The nonlinear problems are mostly difficult in obtaining a meaning full solution. Recent advances in the application of differential equations that particularly occurred in the simulation and modeling of rheological characteristics fluids are major subject of this special issue that has various applications in engineering and industrial disciplines which cannot be explained by a single constitutive relationship. Due to its wide range of applications in engineering, industry, technology, geophysical/astrophysical phenomena, and biomedical sciences several models have been suggested through the differential, integral, and rate type.

At present, there exist several theoretical and experimental problems in mechanical engineering which are still unsolved. This special issue aims to present scientific achievements and attempts to extend exact, semianalytical, and computational methods for mathematical models in mechanical engineering, in both theoretical and applied aspects. In addition, the goal is to establish an international forum to present new and novel developments and achievements in several branches of mechanical engineering.

Potential topics include but are not limited to the following:

- ▶ Applied mathematical modeling and stress analysis in mechanics (elasticity, viscoelasticity, rock mechanics, fracture mechanics, fatigue mechanics, and fluid mechanics)
- ▶ Numerical simulations and approximate technologies for the above topics, such as wavelet, heat balance, variational iterative, homotopy perturbation, homotopy analysis, perturbative series, differential transform, exp-function, integral transform methods finite element, volume and difference methods, and other new technologies
- ▶ Numerical or analytical solutions of laminar/turbulent boundary layer flows
- ▶ Convective heat and mass transfer analysis
- ▶ Newtonian and non-Newtonian fluids
- ▶ Nanofluids
- ▶ Multiphase flow simulations
- ▶ Fractional problems
- ▶ Thermodynamics

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Rahmat Ellahi, University of California Riverside, Riverside, USA
rellahi@engr.ucr.edu

Guest Editors

Constantin Fetecau, Academy of Romanian Scientists, Bucuresti, Romania
c_fetecau@yahoo.com

Mohsen Sheikholeslami, Babol University of Technology, Babol, Iran
mohsen.sheikholeslami@yahoo.com

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