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Editorial

Mathematical and Numerical Modeling of Flow and Transport 2013

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Application areas of flow and transport phenomena vary widely; however, accurate mathematical and numerical simulation of flow and transport remains a challenging topic from many aspects of physical modeling, numerical analysis, and scientific computation. This annual issue concerns numerical and mathematical analysis that are very important for all scientific, engineering, and environmental applications. Rapid progress has been seen in the analysis of flow and transport phenomena especially in recent years because of the significance of flow and transport to science and engineering. The list of papers published in this issue covers a wide range of applications using different approaches and analysis. The list of papers includes nanofluids transport, reservoir modeling, optimization problems, river flow, complex dynamic flow, traffic flow, and finally numerical scheme testing that may be stated as follows.

The first group of papers is devoted to investigate flow and transport of nanofluids. The paper entitled "*Similarity solution of Marangoni convection boundary layer flow over a flat surface in a nanofluid*" by N. Md. Arifin et al. introduced that the problem of steady Marangoni boundary layer flow and heat transfer over a flat plate in a nanofluid is studied using different types of nanoparticles. E. H. Aly and A. Ebaid presented two different analytical and numerical methods in the paper "*New analytical and numerical solutions for mixed convection boundary-layer nanofluid flow along an inclined plate embedded in a porous medium*" to solve the problem of mixed convection boundary-layer nanofluids flow along an inclined plate embedded in a porous medium. The paper "*MHD forced convection laminar boundary layer flow of alumina-water nanofluid over a moving permeable flat plate with convective surface boundary condition*" by S. M. AbdEl-Gaied and M. A. A. Hamad studied the problem of two-dimensional steady forced convection boundary layer viscous incompressible flow of alumina-water nanofluid over a moving permeable vertical flat plate under the effect of a magnetic field normal to the plate. P. Wang et al. have discretized the convective term by two different schemes, namely, strong and weak conservation schemes, in a paper entitled "*Study on the convective term discretized by strong conservation and weak conservation schemes for incompressible fluid flow and heat transfer.*" The paper "*Design and simulation of a fused silica space cell culture and observation cavity with microfluidic and temperature controlling*" by S. Fan et al. focuses on a principle prototype of space animal cell perfusion culture and observation.

The second group concerns oil reservoir problems. W. Wang et al. in the paper "*Flow patterns transition law of oil-water two-phase flow under a wide range of oil phase viscosity condition*" have introduced that a systematic work on the prediction of flow patterns transition of the oil-water two-phase flows is carried out under a wide range of oil phase viscosities, where four main flow regimes are considered including stratified, dispersed, core-annular, and intermittent flow. Also, a paper entitled "*Multiphase, multicomponent simulation for flow and transport during polymer flood under*