Received date: 28-10-2022 | Accepted date: 01-11-2022 | Published date: 23-03-2023

Single & two phase nanofluids flow and the advancement in nanotechnology

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The advanced classification of heat transferring materials is known as nanofluids. A high saturation/suspension of nanoparticles of diameter within 1-100 nanometers is dispersed in some typical base fluids to formulate nanofluids. The classification is further classified as hybrid nanofluids when two or more types of nanoparticles are mixed in one base fluid, say water (in this case). Plenty of liquids can be used as base fluids for hybrid nanofluid formulation; however, water, ethylene, organic liquids, engine oil, bio-fluids, and polymeric solutions are best known. A similar classification is extended with the type of nanoparticles involved in this procedure. Usually, carbon nanotubes, diamond, graphite, metals like gold, copper, silver, and metal oxides like zirconia and Titania are commonly used. The governing equations strictly follow the Navier Stokes equations model in the form of highly nonlinear PDEs. Numerous numerical methods are used to solve the PDEs directly or firstly convert them into ODEs using suitable transformations and solve the nonlinear ODEs using numerical schemes. The impact of volume fraction of nanoparticles, the type of medium, type of base fluid, and many other essential parameters are of significant importance to see the rheological behavior of the nanofluids. In addition, skin friction, heat, and mass transfer rates are analyzed. The findings are critical in many industrial and engineering applications of nanofluids such as pharmaceutical productions, bio-medicine, nuclear actor/reactors, heat exchangers, modeling of geothermal procedures, oil-based reservoirs, and groundwater systems of water management, efficient mechanical devices, etc. Recently, the numerical results are also tested experimentally to validate the findings.

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Biography

Rasool has received his Ph.D. degree in Applied Mathematics from Zhejiang University, China. His research includes the areas of Fluid dynamics, MHD flows, nanofluids, theoretical Physics, Differential Equations, and Mathematical modeling of real-world problems in mechanical engineering. He is Potential Reviewer and Editorial board member of several international journals.

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