A continuum mechanical modelling of forced convection of nanofluids in channels

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Nanofluids are colloidal dispersion of nano-sized particles in traditional heat transfer fluids such as water, oil and ethylene glycol. By adding nanoparticles, the thermal conductivity increases. However, the cause of heat transfer enhancement is still controversial. In the present investigation, we adopt a rigorous continuum mechanical model of nanofluids to resolve these controversies. Based on the rigorous continuum mechanical theory, a pseudo-single-phase model is derived, which is adopted in the analysis of forced convection in a channal. The effects of nanoparticles on the Nusselt number, pressure drop and entrance length are studied.