IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
Impact Factor: 7.53
Volume 4, Issue 1, July 2024

Sensitivity Analysis Nusselt Number Correlation to Thermo Physical and Rheological Properties

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Abstract: *We present the results of sensitivity analysis of thermo physical and rheological properties to temperature and concentration and hence sensitivity of Nusselt number to thermo physical and rheological properties. Sodium alginate which is a power law fluid has been used. Thermo physical and rheological properties were first measured experimentally and using RSM models has been developed as a function of temperature and concentration. Sensitivity of these developed models has been studied for temperature and concentration. From dimensional analysis it was found that Nusselt number depends on the thermo physical and rheological properties of power law fluids. Hence sensitivity of Nusselt number model has been studied for these properties. Studied thermo physical properties include density, surface tenson, specific heat and thermal conductivity. Rheological properties like consistency index and power law index have been studied. The sensitivity analysis indicates that properties, density, surface tension and specific heat are sensitive to temperature than concentration. Result for Nusselt number shows that model is very sensitive to specific heat, thermal conductivity and power law index.*

Keywords: Thermo physical properties, Rheological properties, Nusselt number, sensitivity analysis