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Correlation analysis of the power low viscosity parameters for some engineering fluids

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Abstract

Knowledge and estimation of transport properties of fluids are necessary for mass flow and heat transfer. Viscosity is one of the main properties which are sensitive to temperature and pressure variation. In the present work, based on the use of econometric and statistical techniques for regression analysis and correlation tests, we propose an original equation modeling the relationship between the two parameters of viscosity power low equation. Empirical validation using 90 data-sets of pure fluids provided from the literature and studied at different temperature ranges gives excellent statistical results which allow us to redefine the power low equation using a single parameter instead of two ones. This result is important in fluids engineering since the validation of the proposed equation simplifies the estimation of viscous behavior and the ensuing calculations by reducing the number of viscosity equation parameters and facilitating manipulations. We add that the proposed equation presents good concordance, also for low and moderate viscous fluids, and it is very useful for engineering data which permits to estimate one non-available parameter when the second one is available.

Biography

R B Haj-Kacem has a PhD in Quantitative Methods. Actually, his research interests are the application of statistical and econometric methods on some physicochemical properties in solution which is very useful in some fields such as chemical engineering, petro-chemistry and pharmaceutics. Recently, he has proposed an interesting equation correlating the viscosity Arrhenius parameters which is very important for estimation of non available parameter essential especially for hydraulic calculations of fluid transport.

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