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An Efficient Computational Method Pertaining to Concentration Profiles of Methanol and Pinene in Bio-film Phase Arising in Biochemical Engineering

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Abstract : In this paper, a mathematical model for a mixture of a hydrophobic (α-pinene) and a hydrophilic (methanol) volatile organic compound is discussed. This model describes the system of diffusion equations containing a nonlinear term represents Michaelis-Menten kinetics. The analytical expressions for the concentration profiles of α-pinene and methanol in bio-film phase have been derived by the Legendre computational method (LCM). To The best our knowledge until there is no LCM solution is addressed for the model. The results obtained have been compared with the Adomian decomposition method (ADM) graphically. Excellent agreement between the two methods is noticed.
Keywords: Mathematical modelling; boundary value problem; Legendre computational method.

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