Analytical Solution of Non Linear Problems in Homogeneous Reactions Occur in the Mass-Transfer Boundary Layer: Homotopy Perturbation Method

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Mathematical models for mass transfer accompanied by a reversible homogeneous chemical reaction are discussed. This model is based on a system of nonlinear equations containing a nonlinear term related to reversible homogeneous reactions. When reactions arise in the mass-transfer boundary layer, the measurement of mass transfer to and from electrodes frequently needs the species concentrations. We can obtain the concentration of species by solving the nonlinear equations using the homotopy perturbation method. Our approximate analytical results are also compared with the simulation result. A satisfactory agreement is observed between our analytical and simulation results. The approximate analytical expression obtained here can be used to estimate the system's dynamical behaviour. The influence of the parameters on concentration is discussed and presented graphically.

Keywords: Mathematical modeling, Nonlinear equations, Homotopy perturbation method, Reversible homogeneous reactions.

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