Theoretical analysis of reaction-diffusion process in biocatalyst modified electrodes: Solutions derived via Akbari-Ganji method and Taylor's series with Ancient Chinese algorithms

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The mathematical modelling of bio-catalytically active chemically modified electrodes, including redox enzymes, is discussed. This model is created on a system of nonlinear reaction-diffusion equations with the Michaelis-Menten kinetics of an enzyme reaction. The present report uses the effective analytical methods known as the latest Akbari-Ganji method and Taylor's series with Ancient Chinese algorithms to solve the nonlinear system. Various parameters and their effects on current density are explored. The concentration and fluxes for steady-state conditions were numerically simulated (Matlab) and compared to the analytical data. It is mentioned that an acceptable agreement was reached.

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