Comprehensive Investigation of Solving Analytical of Nonlinear Differential Equations at Chemical Reactions to Design of Reactors by New Method "AGM"

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Abstract : In this symposium, our aims are accuracy, capabilities and power at solving of the complicate non-linear differential at the reaction chemical in the catalyst reactor (heterogeneous reaction). Our purpose is to enhance the ability of solving the mentioned nonlinear differential equations at chemical engineering and similar issues with a simple and innovative approach which entitled ''Akbari-Ganji's Method'' or ''AGM''. In this paper we solve many examples of nonlinear differential equations of chemical reactions and its investigate. The chemical reactor with the energy changing (non-isotherm) in two reactors of mixed and plug are separately studied and the nonlinear differential equations obtained from the reaction behavior in these systems are solved by a new method. Practically, the reactions with the energy changing (heat or cold) have an important effect on designing and function of the reactors. This means that possibility of reaching the optimal conditions of operation for the maximum conversion depending on nonlinear nature of the reaction velocity toward temperature, results in the complexity of the operation in the reactor. In this case, the differential equation set which governs the reactors can be obtained simultaneous solution of mass equilibrium and energy and temperature changing at concentration.