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Set of attraction of specific initial data in a nonlinear diffusion problem

A nonlinear advection-diffusion equation with sorption is considered. Three classes of exact solutions (part of them suggested by the renormalization group method) for some approximate equations are derived. It is found that for large time most of these solutions tend towards a certain function. This is a selfsimilar solution of the equation obtained by neglecting and for cases whose the change of sorption dominates the rate of change of concentration. We proved that this situation holds and reflect the conditions in experiments. This explains the good agreement of the theoretical and experimental results.