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More common errors in finding exact solutions of nonlinear differential equations. I

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In the recent paper by Kudryashov [Commun. Nonlinear Sci. Numer. Simulat., 2009, V.14, 3507-3529] seven common errors in finding exact solutions of nonlinear differential equations were listed and discussed in detail. We indicate two more common errors concerning the similarity (equivalence with respect to point transformations) and linearizability of differential equations and then discuss the first of them. Classes of generalized KdV and mKdV equations with variable coefficients are used in order to clarify our conclusions. We investigate admissible point transformations in classes of generalized KdV equations, obtain the necessary and sufficient conditions of similarity of such equations to the standard KdV and mKdV equations and carried out the exhaustive group classification of a class of variable-coefficient KdV equations. Then a number of recent papers on such equations are commented using the above results. It is shown that exact solutions were constructed in these papers only for equations which are reduced by point transformations to the standard KdV and mKdV equations. Therefore, exact solutions of such equations can be obtained from known solutions of the standard KdV and mKdV equations in an easier way than by direct solving. The same statement is true for other equations which are equivalent to well-known equations with respect to point transformations.

Comments: 18 pages, more papers on the subject are commented
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