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Bäcklund Transformation and Similarity Reductions of Nonlinear Partial Differential Equations Using Extended Homogeneous Balance Method

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Abstract: Two new applications of homogeneous balance (HB) method are presented. It is shown that HB method can be extended to search for the Bäcklund transformations and similarity reductions of nonlinear partial differential equations. The close relations among the HB method, Weiss-Tabor-Carnevale method and Clarkson-Kruskal direct reduction method are also found. KdV-MKdV equation is considered as an illustrative example, and its one kind of Bäcklund transformation, three kinds of similarity reductions and several kinds of travelling wave solutions are obtained by using extended HB method.

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