A new approach related with group analysis and hodograph type transformation for constructing exact solutions

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Abstract

The method suggested in the manuscript uses the idea of the hodograph transformation method, which exchanges the independent and dependent variables. Here a change of the independent variables into dependent variables is applied to first derivatives. For the derivatives one obtains a system of differential equations. Group analysis is applied to this system. New invariant solutions, which are not invariant for the original equations, are obtained. The approach is illustrated by the semi-linear wave equation. For example, for Pion Meson equation one obtains a solution, which is reduced to quadrature.
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