

Lie group approach for constructing all reciprocal transformations. The two-dimensional stationary gas dynamics equations

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March 31, 2022

Abstract

Recently, an infinitesimal approach for finding reciprocal transformations has been proposed. The method uses the group analysis approach and consists of similar steps as for finding an equivalence group of transformations. The new method provides a systematic tool for finding classes of reciprocal transformations (group of reciprocal transformations). Similar to the classical group analysis this approach can be also applied for finding all reciprocal transformations (not only composing a group) of the equations under study. The present paper provides this algorithm. As an illustration, the method is applied to the two-dimensional stationary gas dynamics equations. Equivalence group, group of reciprocal transformations and completeness of all discrete reciprocal transformations are presented in the paper. The results are stated in form of a theorem.

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