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Propagation of non-linear waves in a non-ideal relaxing gas
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Abstract
We have derived an evolution equation governing the far-field behaviour of small amplitude waves in a non-ideal relaxing gas for planar and converging flow. Asymptotic expansions of the flow variables for small amplitude waves have been used to derive the evolution equation. This equation turns out to be a generalized Burger's equation. The numerical solution of this equation is obtained by using the homotopy analysis method (HAM) proposed by Liao with two different initial conditions. Using the HAM, we have studied the effect of relaxation and nonlinearity. The convergence control parameter enables us to find a good approximate solution for such a complex flow problem. This method also confirms the capabilities and usefulness of convergence control parameter and HAM for complex and highly non-linear problems. © 2017, © 2017 Informa UK Limited, trading as Taylor & Francis Group.

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