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Solution of propagation of acoustic-gravity waves in the atmosphere using finite difference method of order two

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Abstract

Investigating waves propagation's equation in the atmosphere is one of the important and widely used issues in various sciences, which has attracted many researchers. A type of propagating waves is an acoustic-gravity wave. These type of waves have a lot of stationarity properties and can be propagate to a high altitude in the atmosphere. The equation of acoustic-gravity wave propagation is a hyperbolic nonlinear hydrodynamic equation consisting of continuity, motion, and energy equations. To obtain the solution of the acoustic-gravity waves propagation equation, the related hydrodynamic equations are written in the form of a conservation equation. In the next step, the propagation of the acoustic-gravity wave is simulated in the atmosphere using a two-stage Lax-Wendroff method, which is a finite difference method with a second order accuracy in place and time.

Keywords: Acoustic-gravity waves, Atmosphere, Tow-stage Lax-Wendroff, Finite difference, Hyperbolic equation.

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