عنوان مقاله:

Numerical simulation of transient natural gas flow in pipelines using high order DG-ADER scheme

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خلاصه مقاله:

To increase the numerical accuracy in solving engineering problems, either conventional methods on a fine grid or methods with a high order of accuracy on a coarse grid can be used. In the present research, the second approach is utilized and the arbitrary high order Discontinues Galerkin Arbitrary DERivative (DG-ADER) method is applied to analyze the transient isothermal flow of natural gas through pipelines. The problem is investigated one dimensionally and the effect of friction force between the pipe wall and fluid flow is considered as a source term on the right-hand side of the momentum equation. Therefore, the governing equations have a hyperbolic nature. Two real problems with available field data are simulated using this method. The results show that using DG-ADER method, high accurate results can be obtained even on a coarse grid. Furthermore, the conventional small-amplitude oscillations of DG-ADER scheme do not appear in the transient natural gas flow problems, due to the smoothness of flow field properties.

کلمات کلیدی:

transient natural gas flow, Numerical simulation, high order DG-ADER scheme, isothermal flow

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