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A finite volume method for a two-phase multicomponent polymer flooding

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Abstract

Multicomponent polymer flooding is an enhanced oil recovery technique used in petroleum industry. A simulation model of this process is governed by a system of coupled non-strictly hyperbolic conservation laws. In this talk we present a finite volume method to execute the numerical simulation of this model. In the presence of gravity, the flux functions involved in the modelling equations need not be monotone and hence designing Godunov type upwind schemes is difficult and computationally expensive. To overcome this difficulty, we use the basic idea of discontinuous flux to reduce the coupled system into an uncoupled system of scalar conservation laws with discontinuous coefficients. For these scalar equations we use the basic idea of discontinuous flux to construct a second order scheme. The scheme is shown to satisfy a maximum principle and the performance of the scheme is shown on both one and two dimensional test problems.

References

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