Simple waves and nonlinear stability of two-layer flows

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Abstract:

Nonlinear stability of two-layer flows under the shallow-water assumption and with the Boussinesq approximation has been studied in [2] and [4]. These two papers also provide necessary and sufficient conditions, respectively, for nonlinear stability of quasilinear systems of mixed type in general. In the current work, we examine nonlinear stability of two-layer flows under the shallow-water assumption but without the Boussinesq approximation. Furthermore, we use the concept of simple waves to understand nonlinear stability and to obtain results for hyperbolic systems analogous to the maximum principles for elliptic and parabolic systems. All the results are illustrated with numerical computations.

References:

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