

**Neta, B.; Navon, I. M.**

**Analysis of the Turkel-Zwas scheme for the shallow-water equations.** (English) Zbl 0669.76037  
*J. Comput. Phys.* 81, No. 2, 277-299 (1989).

A transfer function analysis is used to analyze the Turkel-Zwas explicit large time step scheme applied to the shallow-water equations [*E. Turkel* and *G. Zwas* in: *Advances in computer methods for partial differential equations. Proc. third IMACS Internat. Sympos. Comput. Meth. Partial Diff. Equ.*, Lehigh Univ., Bethlehem, Pennsylv., USA (1979; [Zbl 0477.65067](#)); ed. by R. Vichnevetsky and R. S. Stepleman]. The transfer function concept leads to insight into the behavior of this discretization scheme in terms of comparison between continuous and discrete amplitude, phase, and group velocity coefficients. The dependence of the distortion increases with the increase in the time-step size taken for the Turkel-Zwas scheme, which depends on the ratio between a coarse and a fine mesh. A comparison with earlier results of *A. L. Schoenstadt* [Naval Post-Graduate School Report NPS-53-79-001, 1978 (unpublished)] shows the Turkel-Zwas scheme to give reasonable results up to time steps three times larger than the CFL limit.

**MSC:**

- [76B15](#) Water waves, gravity waves; dispersion and scattering, nonlinear interaction  
[65Z05](#) Applications to the sciences

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**Keywords:**

transfer function analysis; Turkel-Zwas explicit large time step scheme; shallow-water equations; discretization scheme

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