

**Bao, Weizhu; Sun, Fangfang**

**Efficient and stable numerical methods for the generalized and vector Zakharov system.**  
(English) [Zbl 1076.35114](#)  
SIAM J. Sci. Comput. 26, No. 3, 1057-1088 (2005).

The paper presents stable numerical methods for GZS and vector ZS with and without a linear damping term. The methods are explicit, unconditionally stable, and of spectral-order accuracy in space and second-order accuracy in time. It is based on an time-splitting discretization of a NLS-type equation in GZS; discretizing a nonlinear wave-type equation by a pseudospectral method for spacial derivatives; solving the ODEs in phase space analytically or applying Crank-Nicolson scheme for time derivatives.

Reviewer: [Igor Andrianov \(Köln\)](#)

**MSC:**

- [35Q55](#) NLS equations (nonlinear Schrödinger equations)
- [65N12](#) Stability and convergence of numerical methods for boundary value problems involving PDEs
- [65T40](#) Numerical methods for trigonometric approximation and interpolation
- [81-08](#) Computational methods for problems pertaining to quantum theory

Cited in **22** Documents

**Keywords:**

generalized Zakharov system; NLS; time transverse invariant; subsonic limit; meshing strategy; nonlinear Schrödinger equation; pseudospectral method; Crank-Nicolson scheme

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