

A Numerical Method for Nonlinear Stochastic Wave Equations in \mathbb{R}^1

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ABSTRACT: A new semi-analytic nonstandard numerical method for stochastic wave equations in \mathbb{R}^1 with general power-law nonlinearity and Q -regular space-time noise is suggested. This method can conserve the expected generalized energy functional for appropriate parameter choices while adapted initial values are supposed. It is based on the eigenfunction approach leading to truncated Fourier series discretized in time.

Key words and phrases. Stochastic wave equations; nonlinear wave equations; numerical approximations; energy conservation; partial-implicit Euler-type methods; Fourier expansion; Fourier solution; Galerkin approximation.

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