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**Jie Shen\*** ([shen@math.purdue.edu](mailto:shen@math.purdue.edu)), Department of Mathematics, Purdue University, West Lafayette, IN 47906. *A New Spectral-Galerkin Method for High-Dimensional PDEs.*

Many scientific, engineering and financial applications require solving high-dimensional PDEs. However, traditional tensor product based algorithms suffer from the so called "curse of dimensionality". We shall present a new spectral-Galerkin method for non-periodic problems and/or in the whole space. The method is based on two basic ingredients: (i) Choosing the frequencies of the trial functions from the "hyperbolic cross"; (ii) Using a lattice rule or sparse grid to perform the numerical integration. It is shown that with this combination, the "curse of dimensionality" can be broken to some extent. We shall present rigorous error estimates and numerical results supporting this statement. (Received September 14, 2008)