Meeting: 1006, Lubbock, Texas, SS 9A, Special Session on Theory and Application of Stochastic Differential Equations

1006-60-252 **Henri Schurz*** (hschurz@math.siu.edu), Department of Mathematics, Southern Illinois University, 1245 Lincoln Drive, Carbondale, IL 62901-4408. *L^p-convergence of Waveform Relaxation Methods for Numerical Integration of Stochastic Differential Equations.*

Consider the problem of proving L^p-convergence of efficient numerical methods for large-scale nonlinear stochastic systems such as high-dimensional ordinary stochastic differential equations (SDEs) or singularly perturbed SDEs. To solve it, an operator equation of the form $X = TX + G$ in an appropriate Banach space E of adapted, cadlag stochastic processes describing an initial- or boundary value problem of a system of ordinary SDEs is investigated. Our basic assumption is that the underlying system consists of weakly coupled subsystems. The proof of the convergence of corresponding waveform relaxation methods depends on the property that the spectral radius of an associated matrix is less than one. The entries of this matrix depend on the Lipschitz-constants of a decomposition of T. We derive conditions for the convergence under "classical" vector-valued Lipschitz-continuity of an appropriate splitting of the system of SDEs. A generalization of these key results under one-sided Lipschitz continuous and anticoercive drift coefficients of SDEs is also presented. Finally, we consider a system of singularly perturbed SDEs as an illustrative example. This work presents the main results of a joint project with Klaus R. Schneider (WIAS, Berlin). (Received February 15, 2005)