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Space-Time Finite Element Approach for the Semilinear Wave Equation HYUN LIM, South Dakota State Univ, MATTHEW ANDERSON, Indiana University, JUNG-HAN KIMN, South Dakota State Univ — For certain formulations of partial differential equations, proper time-parallel pre conditioners can be successfully applied in space-time finite element simulations. Such an approach may enable the extraction of more parallelism to better utilize high performance computing resources. In this work, we examine the behavior of the semi linear wave equation in 1 + 1 dimensions using space-time finite elements. We discretize space and time together for the entire domain using a finite element space which does not separate time and space basis functions. We also explore the effectiveness of the time additive Schwarz preconditioner for this problem. We explore the semi linear wave equation at the threshold of singularity formation using p=7 for the nonlinear term and search for self-similarity using a non-uniform mesh in both space and time.

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