

## Refined error estimates and decay properties for a damped semilinear wave equation

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This talk will concern the approximation of a semilinear wave equation with space-dependent damping in one space dimension. After rewriting the equation as a first order system, we present an approach for proving rigorous  $L^1$  error estimates for certain classes of approximations. The main relevant features are that these approximations preserve stationary solutions and that the  $L^1$  difference with exact solutions is bounded uniformly in time, therefore leading to accurate estimates for large times. Moreover, a decay property of the total variation of the solution is shown in the region where the damping is supported. This will be related to a well-known property of decay of energy for the damped wave equation.

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- [1] D. Amadori, L. Gosse. Error Estimates for Well-Balanced and Time-Split Schemes on a Damped Semilinear Wave Equation. *Math. Comp.* **85** (2016), 601-633
- [2] D. Amadori, L. Gosse. Error Estimates for Well-Balanced Schemes on Simple Balance Laws. One-Dimensional Position-Dependent Models, *SpringerBriefs in Mathematics*, 2015