Mathematics > Analysis of PDEs

Nonlinear-damping continuation of the nonlinear Schrödinger equation - a numerical study

G. Fibich, M. Klein

(Submitted on 17 Jul 2011)

We study the nonlinear-damping continuation of singular solutions of the critical and supercritical NLS. Our simulations suggest that for generic initial conditions that lead to collapse in the undamped NLS, the solution of the weakly-damped NLS $$ i\psi_t(t,\X)+\Delta\psi+|\psi|^{p-1}\psi+i\delta|\psi|^{q-1}\psi=0,\qquad0<\delta \ll 1, $$ is highly asymmetric with respect to the singularity time, and the post-collapse defocusing velocity of the singular core goes to infinity as the damping coefficient δ goes to zero. In the special case of the minimal-power blowup solutions of the critical NLS, the continuation is a minimal-power solution with a higher (but finite) defocusing velocity, whose magnitude increases monotonically with the nonlinear damping exponent q.

Subjects: **Analysis of PDEs (math.AP)**; Mathematical Physics (math-ph)
Cite as: **arXiv:1107.3281 [math.AP]**
(or **arXiv:1107.3281v1 [math.AP]** for this version)

Submission history

From: Moran Klein [view email]
[v1] Sun, 17 Jul 2011 07:01:45 GMT (840kb)

Which authors of this paper are endorsers?