



SEMINÁRIO DE EQUAÇÕES DIFERENCIAIS

The effect of signal on the scalar Chen-Simons equation

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Resumo: We investigate the effect of admitting signed measures on the scalar Chern-Simons equation

$$(0.1) \quad -\Delta u + e^u(e^u - 1) - 1 = \mu \quad \text{em } \Omega$$

with Dirichlet condition, in terms of stability of solutions. In a previous work [3], approximating μ in the weak*-topology by a nonnegative sequence of Radon measures, we show that the sequence of solutions converges to largest subsolution of the Dirichlet problem, that is the limit of solutions satisfies the scalar Chern-Simons with the largest measure less than μ such that (0.1) has a solution, denoted by μ^* . We are now interested in analysing the approximating scheme by sequences of signed measures Radon. Unlike the former case, the difference of the convergence

speed between negative and positive parts of the sequence of measures will produce extra Dirac measures, that is if the sequence of solutions converges, then the limit solves (0.1) with μ^* suffering a mass loss given by a Dirac measures sum. Furthermore, all measures obtained from μ^* by decreasing a such type of sum can arise as data in the scalar Chern-Simon problem for a limit solution. These two results together characterize the limit solutions of approximating sequences.

References

- [1] Brezis, H, Marcus, M, and Ponce, A. C.; *Nonlinear elliptic equations with measures revisited. Mathematical aspects of nonlinear dispersive equations*, 55 –109, Ann. of Math. Stud., Princeton Univ. Press, Princeton, NJ, 2007.
- [2] Ponce, A. C. and Presoto, A. E.; *Limit solutions for the Chern-Simons equation*, Nonlinear Anal., **84** (2013), 91–102.
- [3] Presoto, A. E.; *The effect of signed measures on the scalar Chern-Simons equation*, To appear.