Normalized solutions of Kirchhoff equations with critical and subcritical nonlinearities: the defocusing case

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In this paper, we study the following problem

$$-\left(a+b\int_{\mathbb{R}^3}|\nabla u|^2\right)\Delta u=\lambda u+|u|^{p-2}u+\mu|u|^{q-2}u \text{ in } \mathbb{R}^3,$$

under the constraint $\int_{\mathbb{R}^3}u^2=c^2$, where a,b, and c are positive constants, λ is a real number, $\mu<0$, $2<q<p\leq 6$. We study the existence and nonexistence of solution in the subcritical and critical case in the exponent p. The result extend the preview ones for the case $\mu<0$, so called into the literature of defocusing case. To prove the existence of solution we use an appropriate minimax theorem combined with dilations which preserve the L^2 norm and with fiber maps. In the critical case, for nonexistence of solution the main tool is the Hadamard three spheres theorem. To appear in SN PDE & Appl.

This is a joint work with P. C. Carrião and A. Vicente.

This work was supported by CNPq grant 307061/2018-3 and FAPESP grant 2019/24901-3.