



ANALYSIS SEMINAR

Equivalent conditions for existence of three solutions for a problem with discontinuous and strongly-singular terms

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Date: 10/05/2019

10h30

Auditorium

Abstract. In this paper, we are concerned with a Kirchhoff problem in the presence of a strongly-singular term perturbed by a discontinuous nonlinearity of the Heaviside type in the setting of Orlicz-Sobolev space. The presence of both strongly-singular and non-continuous terms bring up difficulties in associating a differentiable functional to the problem with finite energy in the whole space $W_0^{1,\Phi}(\Omega)$. To overcome this obstacle, we established an optimal condition for the existence of $W_0^{1,\Phi}(\Omega)$ -solutions to a strongly-singular problem, which allows us to constrain the energy functional to a subset of $W_0^{1,\Phi}(\Omega)$ to apply techniques of convex analysis and generalized gradient in Clarke sense.

References

- [1] FARACI, F. AND SMYRLIS, G. - *Three Solutions for a Singular Quasilinear Elliptic Problem*, Proceedings of the Edinburgh Mathematical Society, 2016, 1–18.
- [2] Marano, S. A. and Motreanu, D. - *On a three critical points theorem for non-differentiable functions and applications to nonlinear boundary value problems*, Nonlinear Analysis (48), 2002, 37–52.