Analysis Seminar

Nonlinear elliptic equations: new results and some perspectives

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Abstract. In this talk, I shall report on some results contained in the recent papers [1]-[3].
I am concerned with two classes of nonlinear elliptic equations driven by nonstandard differential operators. I first consider a nonlinear eigenvalue problem driven by the unbalanced Laplace operator. We establish a striking result showing that the problem has a continuous spectrum starting from the principal eigenvalue of the Laplace operator. Furthermore, this unbalanced operator has a discontinuity property of the spectrum as the parameter goes to 1.
In the second part of this talk, I shall discuss some recent results concerning a new quasilinear operator introduced by Stuart. The study covers the sublinear and linear cases and several open problems and perspectives are also raised. There are also discussed the subcritical and critical cases for problems with lack of compactness.

References

[1] N.S. Papageorgiou, V.D. Rădulescu, D. Repovš, Double-phase problems and a discontinuity property of the spectrum, *Proc. Amer. Math. Soc.* **147** (2019), 2899-2910.

[2] L. Jeanjean, V.D. Rădulescu, Nonhomogeneous quasilinear elliptic problems: linear and sublinear cases, *J. d'Analyse Math.*, in press.

[3] G. Figueiredo, V.D. Rădulescu, Nonhomogeneous indefinite problems with lack of compactness: subcritical and critical cases, paper in preparation.