Workshop APPLIED MATHEMATICS: METHODS AND MODELING
Craiova, May 7 - 8, 2017

Perturbed fractional eigenvalue problems

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Abstract: Let $\Omega \subset \mathbb{R}^N$ $(N \geq 2)$ be a bounded domain with Lipschitz boundary. For each $p \in (1, \infty)$ and $s \in (0, 1)$, we denote by $(-\Delta_p)^s$ the fractional (s, p)-Laplacian operator. We study the existence of nontrivial solutions for a perturbation of the eigenvalue problem $(-\Delta_p)^s u = \lambda |u|^{p-2} u$, in Ω, $u = 0$, in $\mathbb{R}^N \backslash \Omega$, with a fractional (t, q)-Laplacian operator in the left-hand side of the equation, when $t \in (0, 1)$ and $q \in (1, \infty)$ are such that $s - N/p = t - N/q$. We show that nontrivial solutions for the perturbed eigenvalue problem exists if and only if parameter λ is strictly larger than the first eigenvalue of the (s, p)-Laplacian. This talk is based on some recent results obtained in collaboration with Mihai Mihăilescu and Denisa Stancu-Dumitru.