

NONLOCAL HADAMARD FORMULA AND ITS CONSEQUENCES

SIDY MOCTAR DJITTE

GOETHE UNIVERSITY, FRANKFURT

ABSTRACT. We compute the fractional shape derivative for the semilinear eigenvalue problem $(-\Delta)^s u = \lambda_{s,p}(\Omega)u^{p-1}$ in Ω and $u = 0$ on Ω^c for a bounded $C^{2,\varepsilon}$ domain Ω . As an application, we characterize by mean of an overdetermined problem local minimizers of $\lambda_{s,p}(\Omega)$ under volume constraint deformations. We also consider the optimization problem for the Dirichlet first eigenvalue $\lambda_{s,2}(\Omega)$ in balls with holes. We show that $\lambda_{s,2}(\Omega)$ is maximizes when the hole is located at the center of the ball.

The talk is based on join work with Mouhamed Moustapha Fall (AIMS-Senegal) and Tobias Weth (Goethe University, Frankfurt).