

1137-35-270

Dennis Kriventsov* (dennisk@cims.nyu.edu), 251 Mercer St, New York, NY 10003. *Regularity for Shape Optimizers: The Degenerate Case.*

We consider minimizers of

$$F(\lambda_1(\Omega), \dots, \lambda_N(\Omega)) + |\Omega|,$$

where F is a function nondecreasing in each parameter, and $\lambda_k(\Omega)$ is the k -th Dirichlet eigenvalue of Ω . This includes, in particular, functions F which depend on just some of the first N eigenvalues, such as the often studied $F = \lambda_N$. The existence of a minimizer, which is also a bounded set of finite perimeter, was shown recently. Here we show that the reduced boundary of the minimizers Ω is made up of smooth graphs, and examine the difficulties in classifying the singular points. Our approach is based on an approximation ("vanishing viscosity") argument, which—counterintuitively—allows us to recover an Euler-Lagrange equation for the minimizers which is not otherwise available. (Received February 05, 2018)