

**Francesco Chiacchio** (University of Naples)

**Symmetrization and Neumann eigenvalues**

**Abstract**

Using the so-called “symmetrization” methods, we prove a sharp lower bound for the first nontrivial Neumann eigenvalue  $\mu_1(\Omega)$  of the  $p$ -Laplace operator in a Lipschitz, bounded domain  $\Omega \subset \mathbb{R}^n$ . Our estimate, on one hand, does not require any convexity assumption on  $\Omega$ , on the other, at least for  $p = n = 2$ , is sharp. Moreover, in a suitable class of convex planar domains, our estimate improves the one provided by the celebrated Payne-Weinberger inequality.

Time permitting, we will mention another lower bound for  $\mu_1(\Omega)$ . We prove that, when  $p = n = 2$  and  $\Omega$  consists of the points on one side of a smooth curve  $\gamma$ , within a suitable distance  $\delta$  from it, then  $\mu_1(\Omega)$  can be sharply estimated from below in terms of the length of  $\gamma$ , the  $L^\infty$  norm of its curvature and  $\delta$ .