THE BEHAVIOUR OF THE $P(X)-$LAPLACIAN EIGENVALUE PROBLEM AS $P(X) \to \infty$

Mayte Perez-Llanos, *U. Carlos III de Madrid*

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In this talk we study the behaviour of the solutions to the eigenvalue problem corresponding to the $p(x)-$Laplacian operator

$$\begin{cases} -\mathrm{div}(|\nabla u|^{p(x)-2}\nabla u) = \Lambda_{p(x)}|u|^{p(x)-2}u, & \text{in } \Omega, \\ u = 0, & \text{on } \partial\Omega. \end{cases}$$

as $p(x) \to \infty$. We consider a sequence of functions $p_n(x)$ that goes to infinity uniformly in $\overline{\Omega}$ and we prove, under adequate hypotheses on the sequence p_n, that the corresponding eigenvalues Λ_{p_n} and eigenfunctions u_{p_n} converge to a viscosity solution Λ_∞, u_∞, to the following problem

$$\begin{cases} \min\{-\Delta_\infty u_\infty - |\nabla u|^2 \log(|\nabla u_\infty|)\langle \xi, \nabla u_\infty\rangle,\ |\nabla u_\infty|^q - \Lambda_\infty u_\infty^q\} = 0, & \text{in } \Omega \\ u_\infty = 0, & \text{on } \partial\Omega. \end{cases}$$

Joint work with J. D. Rossi.

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