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Isoperimetric estimates for the first eigenvalue of the p-Laplace operator and the Cheeger constant

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Abstract: First we recall a Faber-Krahn type inequality and an estimate for $\lambda_p(\Omega)$ in terms of the so-called Cheeger constant. Then we prove that the eigenvalue $\lambda_p(\Omega)$ converges to the Cheeger constant $h(\Omega)$ as $p \to 1$. The associated eigenfunction u_p converges to the characteristic function of the Cheeger set, i.e. a subset of Ω which minimizes the ratio $|\partial D|/|D|$ among all simply connected $D \subset\subset \Omega$. As a byproduct we prove that for convex Ω the Cheeger set ω is also convex.

Keywords: isoperimetric estimates, eigenvalue, Cheeger constant, p-Laplace operator, 1-Laplace operator
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