

## Uniqueness for the $\infty$ -eigenvalue problem

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**Abstract:** In this talk I consider the first eigenvalue (and the corresponding first eigenfunctions) of the  $\infty$ -Laplacian operator  $\Delta_\infty$  (see Aronsson (1966)). First I obtain in a new way the  $\infty$ -eigenvalue equation

$$\min\{|\nabla u|(x) - \Lambda_\infty u(x); -\Delta_\infty u(x)\} = 0, \quad x \in \Omega$$

(already obtained, by means of a "viscosity" approach, by Juutinen, Lindqvist and Manfredi (1999)), then I discuss some qualitative properties of the first eigenfunctions and, finally, I show for a class of domains  $\Omega \subseteq \mathbb{R}^n$  the uniqueness of the first eigenfunction in the viscosity sense.

The simplicity of the first eigenvalue for every domain  $\Omega \subseteq \mathbb{R}^n$  was already known for  $p \in (0, \infty)$  (see Lindqvist (1985); see also a joint work with Bernhard Kawohl (2002) for a different proof).

The results presented in this talk are part of a joint work with Alfred Wagner (Aachen).