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STRONG COMPARISON PRINCIPLE AND MULTIPLICITY RESULTS FOR FINSLER p-LAPLACE EQUATIONS

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Abstract. In this paper, we consider the family of problems

$$\begin{cases} -\Delta_{H,p}u = f_\lambda(x,u) & \text{in } \Omega, \\ u > 0 & \text{in } \Omega, \\ u = 0 & \text{on } \partial\Omega, \end{cases}$$

where Ω is a smooth bounded domain in $\mathbb{R}^N$, $N \geq 2$, λ is a real parameter and the anisotropic Finsler p-Laplacian operator $\Delta_{H,p}$ with $1 < p < N$, is defined as $\Delta_{H,p}u := \operatorname{div}(H(\nabla u)^{p-1}\nabla_\eta H(\nabla u))$. The non-linear term $f_\lambda\colon \Omega\times\mathbb{R}\to\mathbb{R}$ is the sum of a sublinear and a superlinear term. We establish the strong comparison principle and extend the well-known Brezis–Nirenberg result concerning local minimization in C_0^1 and $W_0^{1,p}$ to the framework of the Finsler p-Laplace operator. Under various growth assumptions on the non-linear term $f_\lambda(x,s)$ and the real parameter λ, we establish the existence, non-existence and multiplicity of solutions.

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