Positive radial solutions for systems involving potential Lane-Emden nonlinearities and Minkowski operator

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Using topological degree arguments, critical point theory and lower and upper solutions method we establish non-existence, existence and multiplicity of radial positive solutions for one parameter systems involving Lane-Emden type nonlinearities,

\[
\begin{align*}
\mathcal{M}(u) + \lambda \mu(|x|)(p+1)u^{p}v^{q+1} &= 0, \quad \text{in } B(R), \\
\mathcal{M}(v) + \lambda \mu(|x|)(q+1)u^{p+1}v^{q} &= 0, \quad \text{in } B(R), \\
u|_{\partial B(R)} = 0 = v|_{\partial B(R)}.
\end{align*}
\]

Here, \(B(R) = \{ x \in \mathbb{R}^N : |x| < R \}, \ N \geq 2 \) is an integer, \( \mu : [0, R] \to [0, \infty) \) is continuous, \( \mu > 0 \) on \((0, R] \), the exponents \( p, q \) are positive, with \( \max\{p, q\} > 1 \) and \( \mathcal{M} \) stands for the mean curvature operator in Minkowski space

\[ \mathcal{M}(w) = \text{div} \left( \frac{\nabla w}{\sqrt{1 - |\nabla w|^2}} \right). \]

This talk is based on joint work with Petru Jebelean and Călin Șerban [1, 2].


References
