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On positive solutions of the Lane-Emden system in the plane

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Abstract

We prove that positive solutions of the Lane-Emden system

$$\begin{cases} -\Delta u = v^p, & u > 0 & \text{in } \Omega, \\ -\Delta v = u^q, & v > 0 & \text{in } \Omega, \\ u = v = 0 & & \text{on } \partial\Omega, \end{cases}$$

in a smooth bounded domain $\Omega \subset \mathbb{R}^2$ are uniformly bounded for all large exponents p, q , provided the exponents are comparable. As a consequence, under this regime, the solutions' energy is uniformly bounded when Ω is star-shaped, a crucial piece of information used in their asymptotic study. In addition, we show that the boundedness may fail if the exponents are not comparable. This is joint work with Boyan Sirakov (PUC-Rio).

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