ASYMPTOTICALLY SELF–SIMILAR GLOBAL SOLUTIONS FOR HARDY–HÉNON PARABOLIC SYSTEMS

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Abstract. In this paper we study the nonlinear parabolic system
\[ \begin{align*}
\frac{\partial u}{\partial t} &= \Delta u + a|x|^{-\gamma}|v|^{p-1}v, \\
\frac{\partial v}{\partial t} &= \Delta v + b|x|^{-\rho}|u|^{q-1}u,
\end{align*} \]
with \( t > 0, \ x \in \mathbb{R}^N \setminus \{0\}, \ N \geq 1, \ a, b \in \mathbb{R}, \ 0 \leq \gamma < \min(N,2), \ 0 < \rho < \min(N,2), \ p, q > 1. \) Under conditions on the parameters \( p, q, \gamma \) and \( \rho \) we show the existence and uniqueness of global solutions for initial values small with respect of some norms. In particular, we show the existence of self-similar solutions with initial value \( \Phi = (\phi_1, \phi_2) \), where \( \phi_1 \), \( \phi_2 \) are homogeneous initial data. We also prove that some global solutions are asymptotic for large time to self-similar solutions.


Keywords and phrases: Nonlinear heat equation, Hardy-Hénon parabolic system, global existence, self-similar solutions, large time behavior.

REFERENCES


