BLOW-UP PROPERTIES FOR PARABOLIC SYSTEMS WITH LOCALIZED NONLINEAR SOURCE

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Abstract. This paper deals with blow-up properties of solutions to a semilinear parabolic system with nonlinear localized source involved a product with local terms

\[ u_t = \Delta u + \exp\{mu(x,t) + nv(x_0,t)\}, \quad v_t = \Delta v + \exp\{pu(x_0,t) + qv(x,t)\} \]

with homogeneous Dirichlet boundary conditions. We investigate the influence of localized sources and local terms on blow-up properties for this system, and prove that: (i) when \( m, q \leq 0 \) this system possesses uniform blow-up profiles, in other words, the localized terms play a leading role in the blow-up profile for this case; (ii) when \( m, q > 0 \), this system presents single point blow-up patterns, or say that local terms dominate localized terms in the blow-up profile. Moreover, the blow-up rate estimates in time and space are obtained, respectively.


Keywords and phrases: parabolic system, nonlinear localized source, nonlinear local terms, uniform blow-up profile, single point blow-up pattern, blow-up rate estimate.

REFERENCES