

**Yang, Wenbin; Wei, Zhaoying; Jiang, Hongling; Li, Haixia; Li, Yanling**

**The existence of steady states for a bimolecular model with autocatalysis and saturation law.** (English) [Zbl 1401.35191](#)

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**Summary:** In this paper, a reaction-diffusion system known as a bimolecular model with autocatalysis and saturation law is considered. Firstly, we briefly obtain some characterizations for the positive solutions, including the a priori estimate of the positive solutions and the nonexistence of non-constant positive solution. Secondly, we emphatically discuss the bifurcation from the unique positive constant solution with both simple eigenvalues and double eigenvalues in one-dimensional case. Meanwhile, some other existence results are shown to supplement the analytical conclusions with the degree theory in  $N$  dimensional case.

**MSC:**

**35K57** Reaction-diffusion equations

**35B35** Stability in context of PDEs

**Keywords:**

bimolecular model; autocatalysis and saturation law; positive steady state; existence and nonexistence; bifurcation; degree theory

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