

**Wu, Jianhua; Ma, Cui; Guo, Gaihui**

**The effect of interaction ratio in a chemical reaction.** (English) Zbl 1284.35452  
IMA J. Appl. Math. 78, No. 6, 1265-1289 (2013).

Summary: This paper is concerned with the effect of interaction ratio in a chemical reaction with zero-flux boundary condition. Treating the interaction ratio  $\gamma$  as a parameter, the existence of non-constant positive steady states is discussed by the bifurcation theory. Especially, the steady-state bifurcation from the double eigenvalue is derived. The Hopf bifurcation analysis to both ordinary differential equations and partial differential equations systems is investigated in detail. Examples of numerical simulations are shown to support and complement the analytical conclusions.

**MSC:**

- [35Q92](#) PDEs in connection with biology, chemistry and other natural sciences
- [92E20](#) Classical flows, reactions, etc. in chemistry
- [35K57](#) Reaction-diffusion equations
- [37J15](#) Symmetries, invariants, invariant manifolds, momentum maps, reduction (MSC2010)
- [35P99](#) Spectral theory and eigenvalue problems for partial differential equations
- [34B09](#) Boundary eigenvalue problems for ordinary differential equations
- [35B32](#) Bifurcations in context of PDEs

Cited in **5** Documents

**Keywords:**

[double eigenvalue](#); [steady-state bifurcation](#); [Hopf bifurcation](#); [simulation](#)

**Full Text:** [DOI](#)