

## BIFURCATION OF STEADY STATES IN A MODIFIED BELOUSOV–ZHABOTINSKIĀ REACTION

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(Submitted by K. Gęba)

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*Dedicated to the memory of Juliusz Schauder*

### 1. Introduction

In [9] and [10] Kuhnert et al. introduced a new model for the Belousov-ZhabotinskiĀ reaction in order to take into account oxygen sensitivity and photosensitivity of the BZR. Various experiments established that especially BZ solutions in uncovered Petri dishes are very sensitive to saturation by oxygen (cf. [4]). In the first approximation, the rate of production of bromide initiated by oxygen may be expressed by a constant flow  $\varphi_1$ . Inhibiting effects were also observed by irradiation of BZ solutions with ultraviolet or visible light. This is included as an additional term  $\varphi_2$ . This approach leads, after scaling, to the following nonlinear evolution system:

$$(1.1) \quad \begin{aligned} \varepsilon_1 \frac{\partial u_1}{\partial t} &= d_1 \Delta_x u_1 + qu_2 - u_1 u_2 + u_1(1 - u_1), \\ \varepsilon_2 \frac{\partial u_2}{\partial t} &= d_2 \Delta_x u_2 - qu_2 - u_1 u_2 + 2hu_3 + \varphi_1 + \varphi_2, \\ \frac{\partial u_3}{\partial t} &= d_3 \Delta_x u_3 + u_1 - u_3 + 3\varphi_2. \end{aligned}$$