

TURNEA, Marius; ILEA, Mihai; ROTARIU, Mariana, *STIFF EQUATION WITH APPLICATION IN PHYSIOLOGICAL EXCITABLE SYSTEMS*

Abstract: The Belousov-Zhabotinsky reaction is quite a fascinating scientific phenomenon such that its cyclical nature can be seen as analogues to: the heartbeat, circadian rhythms, the menstrual cycle, variations in hormone levels, and many others. A nerve cell is thus an example of an excitable medium: the nerve cell returns to its resting steady state after small stimuli, but a sufficiently large stimulus generates an activation before the nerve cell returns to equilibrium. This reaction is a frequently used example for an excitable medium showing propagating oxidation waves. When travelling in a liquid solution without a gel, the chemical waves induce a convective flow in the reaction medium. We will specifically consider the situations in which chemical formalism explain insufficient the formation of biological pattern. Chemical system is also useful to demonstrate the development of the mathematical apparatus which is routinely used in all areas of pattern formation.

Keywords: excitable system, phase-plane, small parameter, asymptotic analyses.

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