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“Existence of stabilized propagating wave segment in wave front interaction model”

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ABSTRACT: Recent experimental studies of photosensitive BZ reaction has revealed the existence of propagating wave segments. The propagating wave segments are unstable, but can be stabilized by using a feedback control to continually adjust the excitability of the medium. Experimental studies also indicate that the locus of the size of stabilized wave segment as a function of the excitability of the medium gives the excitability boundary for the existence of 2D wave patterns with free ends in excitable media.

To study the properties of this boundary curve, we use the wave front interaction model proposed by Zykov and Showalter. This is equivalent to study a first order system of three ordinary differential equations which includes a singular nonlinearity.

Using two different reduced first order systems of two ordinary differential equations, we first show the existence of wave segments for any given propagating velocity. Then the wave profiles can be classified into two types, namely, convex and non-convex types. More precisely, when the normalized propagating velocity is small, we show that the wave profile is of convex type, while the wave profile is of non-convex type when the normalized velocity is close to 1.

参加自由です。皆様のお越しをお待ちしております。

明治大学先端数理科学インスティテュート <http://www.mims.meiji.ac.jp/>

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