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NUMERICAL BIFURCATION AND STABILITY ANALYSIS OF THE NICOLIS-PUHL REACTION AS AN APPLICATION OF CLASS OF INTEGRO PARTIAL DIFFERENTIAL EQUATION

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Abstract. Numerical bifurcation and stability analysis techniques is applied to the specific class of integro-partial differential equations (IPDE). This class of IPDE can be used to study many physical and chemical reaction systems as a dynamical system. The Nicolis-Puhl(NP) reaction an isothermal two-component, autocatalytic reaction exhibiting bistability, perfectly micromixed continuous-flow stirred tank reactor (CSTR) has been shown to be sensitive to the degree of micromixing under non-premixed feed conditions. These properties make it an intersting model to be study as an application of this class of IPDE. The numerical simulation methods studied here has shown excellent numerical stability and the results are similar to those are found by Fox, Villermaux (1990), Fox, Curtis and Halasi (1990), and Fax (1990) for NP reaction. These results also has been verified through numerical simulations of time dpendent solution model.

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