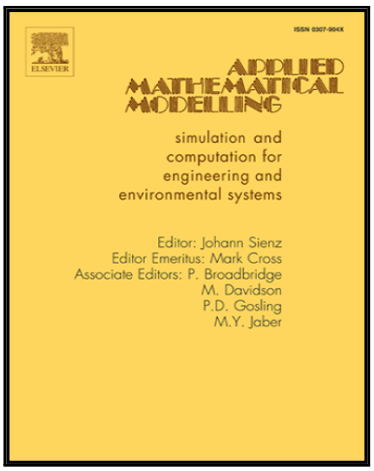

A New Self-Excited Chemo-Fluidic Oscillator Based on Stimuli-Responsive Hydrogels: Mathematical Modeling and Dynamic Behavior

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Highlights

- A new microfluidic oscillator based on smart hydrogels is introduced.
- A piecewise-smooth, infinite dimensional dynamical system is developed to model the oscillator.
- The resulting model is approximated by a discretization scheme based on the method of lines.
- Numerical continuation techniques for non-smooth systems are applied via the toolbox TC-HAT.
- The dynamics of the oscillator is studied in detail in the framework of applied bifurcation theory.