

Limits of spiral wave drift induced by using a line-detector feedback

J. Schlesner*, V. Zykov, H. Engel

TU Berlin, Hardenbergstr. 36, 10623 Berlin, Germany

* Electronic Address: schlesner@physik.tu-berlin.de

We are using a line-detector feedback to control the drift of spiral waves in an excitable medium. Each time a spiral wave front is tangent to the detector a short excitability perturbation is applied globally. Our experimental and numerical data show that this method induce the desired well-controlled spiral wave drift. A theory is developed that describes the spiral wave drift by a high-order iterative map. Under high perturbation strengths or large time-delays in the feedback loop an instability appear due to a Neimark bifurcation. Possible ways to suppress these instabilities and so to abolish restrictions for the drift velocity are discussed.