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Lattice symmetry breaking perturbations for spiral waves

Spiral waves in two-dimensional excitable media have been observed experimentally and studied extensively. It is now well-known that the symmetry properties of the medium of propagation drives many of the dynamics and bifurcations which are experimentally observed for these waves. Also, symmetry-breaking induced by boundaries, inhomogeneities and anisotropy have all been shown to lead to different dynamical regimes as to that which is predicted for mathematical models which assume infinite homogeneous and isotropic planar geometry. Recent mathematical analyses incorpo- rating the concept of forced symmetry-breaking from the Euclidean group of all planar translations and rotations have given model-independent descriptions of the effects of media imperfections on spiral wave dynamics. In this talk, we continue this program by considering rotating waves in dynamical systems which are small perturbations of a Euclidean-equivariant dynamical system, but for which the perturbation preserves only the symmetry of a regular square lattice. This is joint work with Laurent Charette.