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Effect of a modified sinusoidal forcing on spiral waves in a simulated reaction-diffusion system.

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Spiral waves are often found in excitable media and they are abnormal forms of action potential propagation in the case of hearts. Under an external forcing, the spiral waves drift and are subsequently terminated at the boundary. Spiral waves can be studied in simulations using a discrete reaction-diffusion system, thereby the time step must be less than a numerical stability limit (ts). In this article, we present the dynamics of spiral waves in a simulated system under an external forcing as a modified sinusoidal function of time. An optimization of the time step provides the optimal time step of 0.2ts. The spiral waves under the sinusoidal forcing drift along a straight line with a velocity independent on the forcing period. In addition, these spiral waves drift faster than those under a constant forcing with a magnitude equal to the root-mean-square value of the time-varying forcing.

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