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Unpinning of spiral waves from rectangular obstacles by stimulated wave trains

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Pinning phenomena emerge in many dynamical systems. They are found to stabilize extreme conditions such as superconductivity and superfluidity. In cardiology, lengthened tachycardia correspond to propagating action potential in forms of spiral waves pinned to anatomical obstacles including veins and scars. Thus, elimination such waves is important particularly in medical treatments. We present study of unpinning of a spiral wave by a wave train initiated by multiple stimuli at a given location. The spiral wave is forced to leave the rectangular obstacle when the frequency of the wave train is higher than a threshold funpin. We found that funpin increases with the apparent length of obstacle, i.e., the projection of obstacle in the wave train direction. It implies that the orientation of the obstacle, with respect to the propagation of the wave train, plays an important role in the unpinning of the spiral wave

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