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Stability of front-like solutions of the FitzHugh-Nagumo equations on warped cylinders

The FitzHugh-Nagumo model is a reaction-diffusion system that describes the behavior of spiking neurons. While stability of traveling wave solutions is well understood in one dimension, much less is known in two dimensions. In this talk, we will examine the stability of traveling front solutions on the surfaces of both standard and warped cylinders. A standard cylinder has a constant radius, whereas the radius of a warped cylinder varies along its length. The latter geometry offers a more realistic model of the morphology of neuronal axons. I will outline how surface geometry enters the FitzHugh-Nagumo dynamics, describe criteria relevant to nonlinear stability, and illustrate geometric effects through numerical examples.