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Location: Buchanan A202

A contraction argument for two-dimensional spiking neuron models

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Biological neurons have a characteristic spiking behaviour, and modeling this behaviour is an important problem in mathematical neuroscience. A number of two-dimensional spiking neuron models that combine continuous dynamics with an instantaneous reset have been introduced in the literature. The models are capable of reproducing a variety of experimentally observed spiking patterns, and also have the advantage of being mathematically tractable. Here an analysis of the transverse stability of orbits in the phase plane leads to sufficient conditions on the model parameters for regular spiking to occur.