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Attractors for the Singularly Perturbed FitzHugh-Nagumo System.

We study the asymptotic behavior of the FitzHugh-Nagumo system defined on unbounded domains. We prove that the system has a compact global attractor in the standard L^2 space. We also discuss the limiting behavior of global attractors as a parameter ϵ goes to zero. Although the limiting system for $\epsilon = 0$ does not possess a bounded attracting set, we show that all attractors for the perturbed system are contained in a compact subset of the phase space. Furthermore, we construct a compact local attractor for the limiting system and establish the upper semicontinuity of the attractors. We also investigate the existence of global attractors in a weighted Sobolev space which contains traveling waves and spatially periodic solutions. The behavior of the system with a rapidly oscillatory term will be discussed in the end of the talk.

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