1077-35-1151 **Justin C Tzou*** (jtzou@northwestern.edu), Northwestern University, 2145 Sheridan Road, Evanston, IL 60208, **Yana Nec**, Department of Mathematics, University of British Columbia, 1984 Mathematics Road, Vancouver, B.C. V6T 1Z2, Canada, and **Michael J Ward**, Department of Mathematics, University of British Columbia, 1984 Mathematics Road, Vancouver, B.C. V6T 1Z2, Canada. *Slow Drift and Fast Asynchronous Oscillatory Instabilities of Spike Patterns in a One-Dimensional Singularly Perturbed Brusselator Model.*

Much effort has been devoted to determining whether or not equilibrium and quasi-equilibrium spike patterns of a singularly perturbed reaction diffusion system can undergo oscillatory instabilities in which spike amplitudes oscillate out of phase (asynchronously). Studies of activator-inhibitor models, such as the Gray-Scott (GS), with asymptotically small activator diffusivity on finite (Ward et al.) and infinite (Doelman et al.) domains have either predicted dominant synchronous instabilities as a control parameter is increased, or in the case of the GS model, dominant asynchronous instabilities but which are then numerically observed to be unstable in the weakly nonlinear regime. For the Brusselator on finite domain, we show that for a certain range of inhibitor diffusivity, the dominant oscillatory instability is asynchronous. In contrast to the GS model, we present numerical validation of asynchronous amplitude oscillations for both equilibrium and quasi-equilibrium solutions, the latter of which is characterized by dynamically triggered instabilities due to spike locations. We propose explanations for this previously unobserved behavior. We also offer an alternative analysis of small eigenvalues that is significantly simpler than but equivalent to previous analyses. (Received September 16, 2011)