1067-Z1-1261 **Melissa A Stoner***, 14 E Packer Ave, Bethlehem, PA 18015, and **Linghai Zhang**, 14 E Packer Ave, Lehigh University, Bethlehem, PA 18015. *Existence and Stability of Standing Wave Solutions Arising from Synaptically Coupled Neuronal Networks.*

There have been many models of neuronal networks developed and analyzed to determine the wave and speed of the wave in a nerve pulse. The goal of this research is to investigate the existence and stability of standing wave solutions of the system of integral differential equations

$$\begin{aligned}\frac{\partial u}{\partial t} + f(u) + w &= (\alpha - au)\int_0^\infty \xi(c)\left[\int_{\mathbb{R}} K(x-y)H\left(u\left(y, t - \frac{1}{c}|x-y|\right) - \theta\right)\mathrm{d}y\right]\mathrm{d}c \\ &+ (\beta - bu)\int_0^\infty \eta(\tau)\left[\int_{\mathbb{R}} W(x-y)H\big(u(y, t-\tau) - \Theta\big)\mathrm{d}y\right]\mathrm{d}\tau, \\ \frac{\partial u}{\partial t} &= \epsilon\big(g(u) - w\big).\end{aligned}$$

These model equations generalize many important integral differential equations used in most recent related papers when modeling neuronal networks. For the system of integral differential equations, if $f(u) + g(u) = m(u-n) + k(u-l)$ and conditions on the constants and kernel functions are satisfied then there exist two standing waves. Additionally, the stability of the standing wave is dependent on the network's parameters. The results for the system are surprisingly interesting in mathematical neuroscience, especially this change in stability. (Received September 20, 2010)