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**Faina Berezovskaya\*** (fberezovskaya@howard.edu), Mathematics Department, Howard University, Washington, DC, 20059, USA, Washington, DC 20059. “*Fast*” and “*Slow*” Traveling Impulses and Trains in FitzHugh Model with Diffusion and Cross-diffusion.

FitzHugh (FH) model (Biophys. J., 1961) has been used as a caricature of the Hodgkin–Huxley equations of neuron firing and to capture, qualitatively, the general properties of an excitable membrane. The spatial propagation of neuron firing due to diffusion of the current potential was described by the FitzHugh–Nagumo (FHN) model (Proc. IRE ,1962). Assuming that such propagation is caused by not only diffusion but also cross-diffusion connection between the potential and recovery the cross-diffusion version of the FH model gives rise to the typical fast traveling impulses and trains, and additionally to the slow traveling waves exhibited in the diffusion FHN equations (Berezovskaya et al, MBE, 2008). In this paper we study the spatial generalization of FH model with both diffusion and cross-diffusion. Bifurcation approach which has been applied to the analysis of the wave system of the model allowed to find the parameter points and velocities of the wave propagation corresponding to the principal rearrangements of the model behaviors ; supposing one of diffusion or cross- diffusion coefficients be small and applying Tikhonov theorem we showed (by computation) that the model has “fast” and “slow” traveling waves that where observed in the model with only cross-diffusion. (Received September 20, 2016)