CCSU

DEPARTMENT OF MATHEMATICAL SCIENCES

COLLOQUIUM

Friday, November 19

3:00 – 4:00 PM

Maria Sanford, Room 101

SYSTEMS THAT EXHIBIT SELF-SUSTAINED OSCILLATIONS: FROM VAN DER POL OSCILLATOR TO NERVE IMPULSE TRANSMISSION

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Abstract: In 1963, Alan Hodgkin and Andrew Huxley got the Nobel Prize for their fundamental insights into nerve cell excitability. In this talk we will discuss and try to understand nerve impulse transmission studying the Fitzhugh-Nagumo equations which can be seen as a two-dimensional simplification of the Hodgkin-Huxley model of the neuronal action potential.

We will see how to show the existence and uniqueness of the fixed point of the system and the existence of a stable limit cycle within a certain range of values of the governing parameter of the nonlinear system of ODEs. Analytical reasoning and some computations will be used to show that, starting from some value of the governing parameter, the fix point becomes unstable, and a stable limit cycle arises because of a supercritical Hopf bifurcation.

Some of the work presented was done by an undergraduate student.

To join us online use the following link: https://ccsu.webex.com/meet/gotchev

For further information: gotchevi@ccsu.edu; 860-832-2839; https://web.ccsu.edu/colloquium/