Undergraduate Colloquium Monday April 7 4:15 pm, Room: PGH 646

http://www.math.uh.edu/colloquium/undergraduate/



Understanding Chaos: The Lorenz Attractor Professor Andrew Török

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Studying an ordinary differential equation meant to be a simplified weather model, Edward Lorenz discovered in 1963 an object that is called today a strange attractor: nearby points are attracted to a set of fractal dimension, and move around this set chaotically, with sensitive dependence on initial conditions. Understanding this attractor was one of the 18 problems for the twenty-first century proposed in 1998 by Fields medalist Steven Smale. Namely: "Is the dynamics of the ordinary differential equations of Lorenz that of the geometric Lorenz attractor of Williams, Guckenheimer, and Yorke?"

Soon thereafter Warwick Tucker answered this question in the affirmative. His technical proof makes use of a combination of normal form theory and validated interval arithmetic.

The talk will explain what's strange about this attractor, what Smale's question was, models for chaos, and how approximate computations (those done by a computer) were used to prove a mathematical theorem. Images and computer simulations will be included.

Pizza and refreshments will be served.

