Drexel Analysis Seminar

May 5, 2017

12-12:50 PM, Korman 245

Speaker: Tim Faver (Drexel)

Title: Traveling Waves in Mass and Spring Dimer FPUT Lattices

Abstract: The Fermi-Pasta-Ulam-Tsingou (FPUT) lattice is a hypothetical physical construct consisting of infinitely many particles arranged in a line and connected by springs. Newton's second law gives equations of motion for these particles, and our goal is to solve these equations by finding certain kinds of waves that travel through the lattice.

The FPUT lattice enjoys over half a century of numerical studies and rigorous proofs and approximations, all chiefly for "monatomic" lattices of identical particles and springs. Our results concern lattices in which the particles alternate in mass or where the springs exert different forces. These "dimer" lattices exhibit wave behavior notably different from the monatomic case.

Our technical strategy is to convert the dimer lattice equations into a fixed point problem and solve that via a modified, highly quantitative contraction mapping argument. This is joint work with J. Douglas Wright.