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Timothy E Faver* (t.e.faver@math.leidenuniv.nl). *Nanopteron traveling waves for mass-in-mass lattices in the small mass limit.*

The mass-in-mass (MiM), or mass-with-mass, lattice consists of an infinite chain of identical particles that are both nonlinearly coupled to their nearest neighbors and linearly coupled to a distinct resonator particle. The MiM lattice is a prototypical model in the field of granular metamaterials, a large class of artificially constructed materials that possess certain highly tunable properties useful in experimental settings. This talk will present ongoing investigations into the existence and properties of traveling waves in the MiM lattice in the limit as the mass of the resonator goes to zero, at which point the MiM lattice reduces to a classical monatomic Fermi-Pasta-Ulam-Tsingou (FPUT) lattice. We are therefore interested in traveling waves in the MiM lattice whose profiles remain close to the well-known solitary wave that exists in the monatomic FPUT lattice. Following the methods of Hoffman and Wright for diatomic FPUT lattices with small mass ratio, we first discuss the existence of periodic traveling waves in this small mass limit and then construct from them nanopteron traveling waves, which are the superposition of one of these periodic waves, the FPUT solitary wave, and an exponentially decaying remainder. (Received September 25, 2018)