

Title

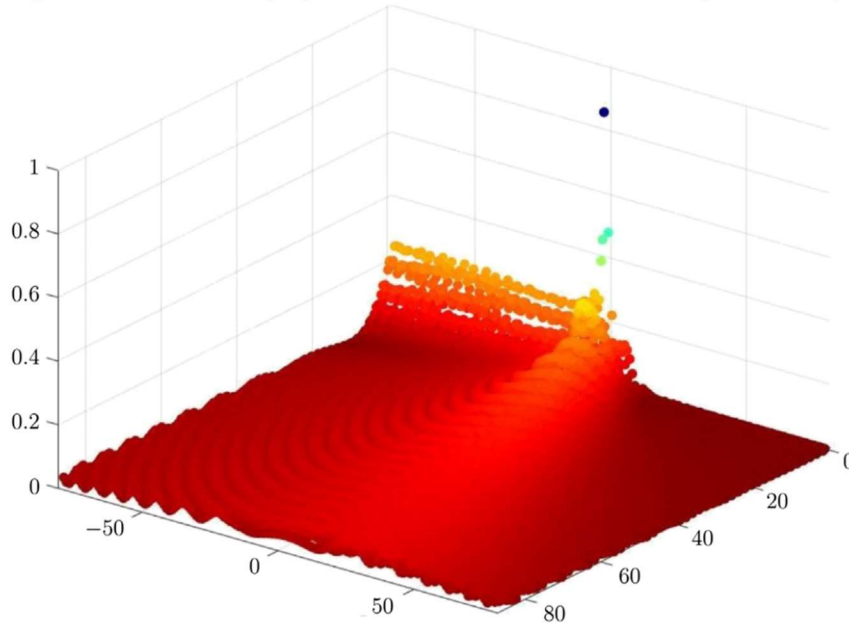
Wave propagation in gyro-elastic micro-structured media

Abstract

In this talk, wave propagation in gyro-elastic structured media are presented. The system is a lattice composed of periodically placed masses interconnected by elastic rods and attached to gyroscopic spinners. The analysis is based on an asymptotic model that describes the interaction between a gyroscopic spinner and a mass embedded in a truss system. Several examples are given that illustrate the transient features of special dynamic phenomena, including unidirectional interfacial waves and highly localised waveforms.

In the second part of the talk Rayleigh waves are analysed in elastic lattices incorporating gyroscopic effects. The vector problems of elasticity for a triangular lattice and its long-wavelength/low-frequency continuum approximation are considered. The analytical procedure gives explicit solutions for the Rayleigh waves for both the discrete and continuous systems. Despite the symmetry of the dispersion curves with respect to the wavenumber, the introduction of the inertial coupling breaks the symmetry of the eigenmodes and makes the system non-reciprocal.

Finally, some preliminar examples of tunable highly-directive systems will be given, where the combined effect of constitutive nonlinearity and gyricity makes it possible to guide waves along specific direction in a non-reciprocal way.



Non-symmetric propagation of Rayleigh waves.