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Effect of Uncertainties on Pulse Attenuation in Dimer Chains with and without Precompression M.A. HASAN, L. PICHLER, D.M. MCFARLAND, A.F. VAKAKIS, University of Illinois at Urbana-Champaign — Unlike homogeneous granular chains which lead to the formation of a solitary wave, polydisperse systems usually exhibit waves with dispersion. For the case of 1d granular chains obeying a strongly nonlinear Hertzian law interaction, much emphasis has been given to diatomic (dimer) granular chains, made of alternating heavy and light beads. When an initial impulse is applied to the free left boundary, this leads to localized oscillations of the light bead and reduces the amplitude of the applied pulse. For certain mass disorder value, considerable attenuation of the applied impulse by up to about 75% can be achieved. However, the response of the dimer chain varies when the effect of uncertainties is included in the system. Here, we model the radii of the light beads as random variables, while keeping the radius of the heavy bead fixed. The effect of uncertainty is investigated using Monte Carlo Simulation and the corresponding transmitted force and time delay are observed. In addition, the same investigation is carried out for a dimer chain with precompression.

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