

Solar container stiffness and energy dissipation stiffness

<div class="df_qntext">Can friction energy dissipation enhance effective stiffness and NPR effect?

The integration of friction energy dissipation mechanism can simultaneously enhance the effective stiffness and NPR effect. The mechanical properties of the proposed structure were investigated using theoretical analysis, experiments, and finite element (FE) simulations.

<div class="df_qntext">Do negative stiffness structures have energy absorption capacity?

However, for negative stiffness structures, in addition to enhancing their energy absorption capability, it is crucial to maintain their reversibility in deformation. Hence, the resilience as well as the energy absorption capacity of the new hierarchical structures are the two key aspects we focus on.

<div class="df_qntext">Does composite negative stiffness have reusability and energy absorption capacity?

The quasi-static test indicated the composite negative stiffness structure has excellent reusability and energy absorption capacity. Inspired by the growth and deformation of tree branches, Zhang et al. designed an induced energy absorption structure (IEAS), which achieves negative stiffness by altering load transfer paths.

<div class="df_qntext">Which materials have negative stiffness effect?

Materials and structures with negative stiffness effect have received widespread attention owing to their outstanding mechanical properties. Soft materials are generally used as the basic materials for this type of structure to ensure good negative stiffness and resilience, but this also leads to low energy absorption capability at the same time.

<div class="df_qntext">Does composite negative stiffness structure absorb more unit volume energy?

The experimental results showed that the compressive strength of the composite negative stiffness structure is higher than the sum of that of the single material negative stiffness structures, and the composite negative stiffness structure absorbs more unit volume energy than the sum of the single ones.

<div class="df_qntext">Do novel designed negative stiffness structures improve energy absorption performance?

Therefore, this study aimed to design, simulate, fabricate, and perform experimental tests on novel designed negative stiffness (NS) structures and improve the performances of negative stiffness structures in terms of energy absorption and keeping their original configuration under cyclic loading.

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The two-component co-continuous structures are usually comprised of hard and soft phases, which can provide outstanding combinations of properties including stiffness, strength, ...

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Mechanical metamaterials with negative stiffness (NS) effects are able to dissipate mechanical energy repeatedly according to the "snap-back" strategy. Nevertheless, the strategy is merely efficient when ...

Design oriented models are proposed for the moment and chord-rotation at yielding, the secant-to-yield-point stiffness, the cyclic ultimate chord rotation and the hysteretic energy ...

: Nonlinear energy sinks (NES) are highly efficient vibration energy absorption and dissipation devices, and play an important vibration-suppression role in many types of structures. In this study, ...

Abstract A negative stiffness shell has a convex first position, but can transition or snap to a concave second position under a force applied to the exterior surface of the shell in the convex first position. ...

Negative stiffness (NS) metamaterials with the capability of elastic energy dissipation have gained substantial attention for their potential in shock absorption and vibration control. However, their ...

In addition, metamaterials with extreme damping and high stiffness have also achieved great progress [[17], [18], [19]]. For example, by optimizing the damping and stiffness of the ...

A new Cyclic Softened Membrane Model (CSMM) was recently developed to predict the stiffness, ductility, and energy dissipation of reinforced concrete (RC) elements subjected to reversed cyclic ...

This criterion can be serves as a guideline for tailoring performance of energy dissipation capability. Actually, the configuration comprising curved (or straight) beams and a supporting frame is ...

Loading Conditions are Key: The type of force applied (static, dynamic, impact) and its frequency will determine the dominant energy dissipation mechanisms. Resonance is a Critical Consideration: ...

Abstract To address the limitation of traditional friction dampers with a single energy dissipation mechanism in providing adaptive full coverage for structures against a wide range of ...

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Mechanical metamaterials with negative stiffness (NS) effects are able to dissipate mechanical energy repeatedly according to the "snap-back" strategy. Nevertheless, the strategy is ...

Recently, a growing number of the containers have been used in the building structures, therefore, the full size container stiffness have been studied under the longitudinal load, including the 20 ...

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The design principles for conventional reinforced concrete structures have gradually transitioned to seismic-resistant design since the 1970s. However, until recently, the implementation ...

Because of their desirable properties, mechanical metamaterials have drawn increasing attention. Negative stiffness (NS) metamaterials can be used as reusable energy dissipation devices, but they ...

Viscous type self-centering devices [47, 48] are difficult to popularize in simple supported beam bridges. The third is a flag-shaped hysteretic behavior with constant post-yield ...

Piecewise linear stiffness energy sinks are a kind of nonlinear energy sinks in a passive damping device, it can dissipate the vibration energy of the main structure quickly by virtue of the phenomenon ...

Heterogeneous materials consist of inelastic "hard" and elastic "soft" domains [1-3] e.g., two-phase elastomers, copolymers, etc. Outstanding properties including stiffness, strength, energy dissipation ...

The results show that the proposed strategy can significantly improve the energy dissipation ability of parallel structures using a small number of negative stiffness cells.

The telegraph equation is employed to model wave fields taking into account energy dissipation and media stiffness. The time-harmonic scattered waves generated by a line source incident upon ...

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Negative stiffness-assisted dampers exhibit simultaneous enhancement of negative stiffness and energy dissipation, yet the linear damping assumption constrains current understanding.

Particularly, negative-stiffness amplification systems (NSASs) have been proposed by connecting negative-stiffness devices and tuning springs in a series configuration and by inserting an ...

In this study, novel negative stiffness structures are designed, fabricated by FDM printing, and subjected under cyclic loading through experimental works and finite element method.

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