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”DYN2#5 - Identification of vibration damping in 3D-printed lattice structures”

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As metallic 3D-printing opens the design space for lightweight structural applications, it also raises challenges in terms of low level vibration damping. Reducing the number of parts is avoiding some classical damping phenomena due to friction mechanisms in mechanical assemblies. In addition, metallic materials do not exhibit intrinsic viscous properties that could significantly contribute to structural damping. In this work, the damping properties of lattice-based structures and possible design solutions offered by Powder Bed Fusion are investigated. In particular, auxetic behaviour, passive energy transfer, and viscoelastic shear layer could be considered. The approach consists in identifying promising concepts from numerical simulations, and validate them experimentally. Underlying questions of predictive capability of damping simulations and identification of damping properties from experiments are addressed.

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