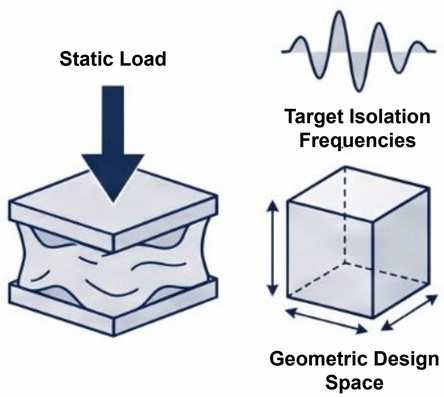
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Generative Design: Automated Optimization of Technical Elastomer Structures

Illustration of the data-driven workflow for the development of high-precision vibration isolators using SARMOO and genetic algorithms.

Input: Definition of Input Parameters

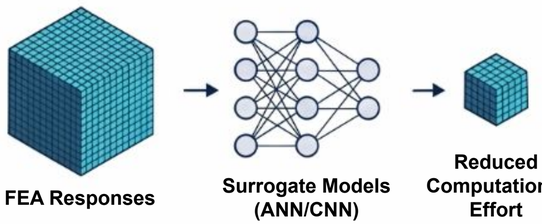
Definition of Load and Design Space Profiles



Analysis of static deflection, resonant frequency, and damping gradient in a closed, iterative loop.

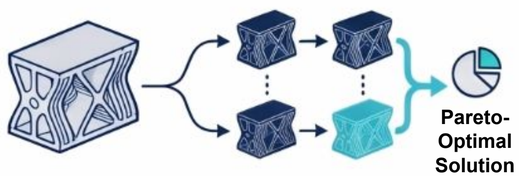
Process: The Generative Optimization Loop

AI-Assisted FEA Acceleration



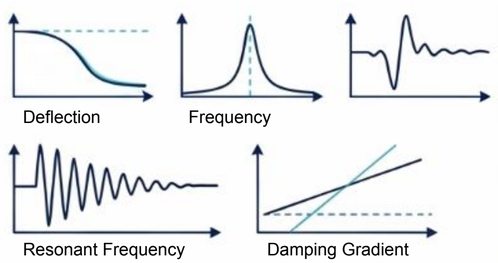
Surrogate models (ANN/CNN) approximate FEA responses to drastically reduce the computational effort for complex, non-linear solid mechanics.

Evolutionary Selection via NSGA-II



A genetic algorithm mutates design parameters and identifies the Pareto-optimal solution.

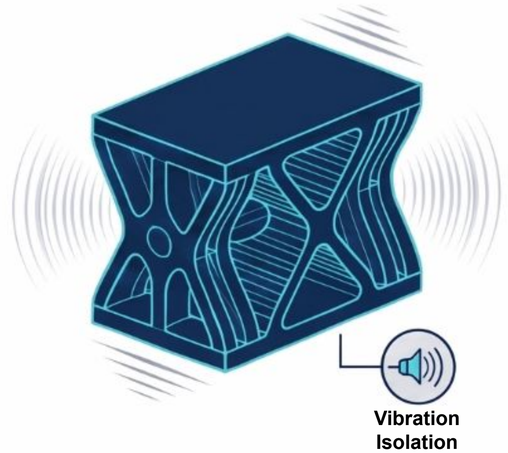
Validation of Dynamic Criteria



Acquisition of the static load, target isolation frequencies, and available geometric design space.

Output: The Final Geometry

Generic Elastomer Structure



The result is a manufacturing-ready, robust structure with optimized vibration damping properties.