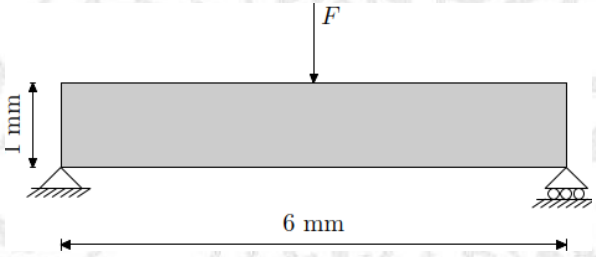
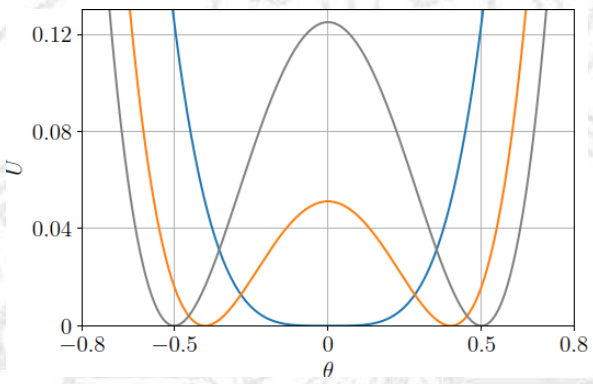
Università degli Studi di Pavia
Computational Mechanics & Advanced Materials Group - DICAr

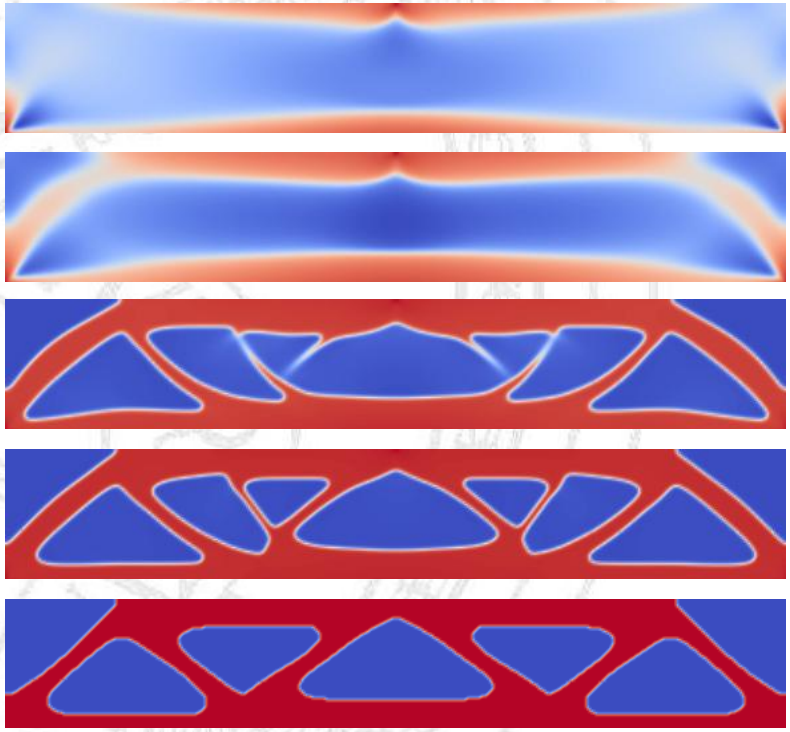
SEMINAR

A “truly” variational method for structural topology optimization based on a Cahn-Hilliard model

Originally developed to model phase separation in alloys, Cahn-Hilliard equations now guide structural topology optimization. We propose a optimization method that conserves mass and all governing equations derive from a single energy functional. This variational structure yields key computational advantages, including 50% reduced memory requirements and quadratic convergence. Physical bounds on the density field and numerical convergence difficulties are addressed via functional transformation and continuation strategies. The result is V-TORCH, a novel variational method with improved numerical stability and lower computational cost compared to existing Cahn-Hilliard-based approaches.







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