

Mathematical Physics

Microscopic structures from reduction of continuum nonlinear problems

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We present an application of the Amann-Zehnder exact finite reduction to a class of nonlinear perturbations of elliptic elasto-static problems. We propose the existence of minmax solutions by applying Ljusternik-Schnirelmann theory to a finite dimensional variational formulation of the problem, based on a suitable spectral cut-off. As a by-product, with a choice of fit variables, we establish a variational equivalence between the above spectral finite description and a discrete mechanical model. By doing so, we decrypt the abstract information encoded in the AZ reduction and give rise to a concrete and finite description of the continuous problem.

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