

Micro-to-macro transition in elasticity via the quasiconvex hull

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We study Morrey's quasiconvexity in the calculus of variations. Our particular interest lies in finding the quasiconvex hull K^{qc} for a given set K . From a solid mechanics point of view, K may represent the ensemble of deformation gradients that are energetically favourable on the microscopic scale. Then K^{qc} contains what is favourable on the macroscopic scale. The set K is known for many materials, while K^{qc} is not. In the planar case and under the additional assumption of material isotropy, we show how to compute K^{qc} for given K .