Fracture and stochastic homogenization in the passage from discrete to continuous systems

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We consider a one dimensional particle system, interacting through nearest-neighbour Lennard-Jones potentials. The non-standard growth conditions and the convex-concave structure of the Lennard-Jones interactions allow for fracture. The interaction potentials are assumed to be randomly distributed. We study the variational limit in the framework of Γ-convergence of this chain of particles which leads to a homogenized energy density. Further, we rescale our model which results in a limiting energy of Griffith's type, consisting of an elastic part and a jump contributions. In a further approach, we study fracture at the level of the discrete energies.

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