Homogenization of Fiber Reinforced Microstructures: The Extremal Cases

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Abstract: We analyze the as umptotic behavior of the antiplane deformations of a *fragile* material reinforced by a reticulated *elastic* structure. The microscopic geometry of this material is described by means of two "small" parameters: The size ϵ of the periodic grid and the ratio δ between the thickness of each of the fibers and their period of distribution. We show that this behavior depends dramatically on the relative size of the parameters. Indeed, in the two considered cases, *i.e.* $\epsilon \ll \delta$ and $\epsilon \gg \delta$, we obtain two different limit models: a perfectly elastic model and an elastic model with macroscopic cracks, respectively.