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Initiation and propagation of fracture in the models of Griffith and Barenblatt. (English)

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Summary: In the setting of the simplest debonding problem we give a systematic comparison of the fracture models due to Griffith and Barenblatt. We prove that the Griffith model represents an asymptotic Γ -limit of the Barenblatt model, when the ratio of the external and internal lengths increases indefinitely. We then illustrate the character of convergence by solving explicitly two sample problems with initially rigid and initially elastic cohesive energies. The geometrical simplicity of the setting allows us to study the small parameter dependence of both global and local minimizers of the total energy.

MSC:

74A45 Theories of fracture and damage

74R10 Brittle fracture

74G65 Energy minimization in equilibrium problems in solid mechanics

Cited in **23** Documents

Keywords:

fracture mechanics; variational methods; gamma-convergence; pull-out test; Barenblatt model

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