

## The energy criterion in quasistatic crack propagation: some special aspects

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Among the various criteria predicting crack propagation mainly the energy criterion of Griffith can be considered as an axiomatic access: A crack can only propagate, if energy will be released. Thereby in applications, especially while considering quasi-static crack propagation in brittle materials the so called energy release rate plays a decisive role. If we consider a linear elasticity problem in a domain containing a crack the total energy is composed of the potential energy and the surface energy. For fixed geometry and external loading the total energy can be considered as a function of the crack path. Considering small putative elongations of a given crack path the change of the potential energy can be calculated using methods of asymptotic analysis. In this lecture we explain some aspects how the energy release rate can be used to calculate the direction of crack paths in a homogeneous material. If the crack approaches a material interface in certain situations these methods can be applied to predict e.g. whether the crack stays stuck in the interface or penetration or delamination appears.