Brittle crack initiation from a circular hole:
From FFM theory to experiments

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The coupled criterion of Finite Fracture Mechanics (FFM) is employed to investigate brittle crack initiation from a circular hole in an infinite slab subjected to remote biaxial loading. Depending on the loading conditions and on the ratio between the crack advance and the hole radius, the crack propagation could reveal to be either unstable (positive geometries), or stable (negative geometries). Furthermore, it is shown that stable paths could follow unstable paths and vice-versa, leading to locally positive/globally negative or locally negative/globally positive configurations. Finally, for each configuration discussed above, the FFM predictions are compared successfully with the experimental data available in the literature [1] and/or recently carried out [2-3], restricting the analysis to the nucleation/failure stress, for the sake of simplicity.

References
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