CRACK GROWTH BY LOSS OF ELLIPTICITY

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Static cohesive crack growth is modelled by a loss of ellipticity criterion. For this purpose, whenever the material loses ellipticity, a crack is inserted in a manner consistent with the ellipticity criterion, i.e. the load parameter and direction of crack growth is determined from the ellipticity indicator. On the crack surface near the tip, a cohesive traction which decreases linearly with the increase of crack opening displacement is applied—nonlinear softening models can be also considered although a linear assumption is used here. The crack is described implicitly by a level set function and the extended finite element method is employed so that no remeshing is necessary as the crack grows. The cracked elements—those split completely and partially, i.e. the tip elements—are enriched in such a way that local partition of unity is guaranteed. Examples that are to be reported include a pre-cracked plate and a single edge tension problem for both straight and curved beams.

References

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