On the development fracture mechanics analysis software system
(crack propagation analysis, automatic meshing technique and evaluations of crack parameters based on FE model composed of tetrahedral elements)

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Abstract:
In this research, we have been developing a fracture/crack propagation analysis system for damaged structures [1]. The system can fully automate the crack propagation analysis. The analysis system is based on:

1. Finite Element Method (FEM) to perform the solid mechanics analysis
2. Delaunay tessellation technique to generate the finite element mesh
3. VCCM (Virtual Crack Closure-Integral Method) and interaction integral method for the evaluations of stress intensity factors

In the seminar, I will briefly present the Delaunay tessellation technique to generate the finite element mesh first and will carry out detailed discussions on methods to compute crack parameters such as J-integral, VCCM and interaction integral ([2], [3] and [4]). Then, the results of several numerical demonstration problems are presented (for example [5]).


