

## PFA - Virtual Crack Closure Technique (PFA\_VCCT)

### Product Highlights:

- Virtual Crack Closure Technique (VCCT) is a fracture mechanics based approach for the progressive crack growth analysis integrated into GENOA-PFA. The technique
  - Is based on the linear spring elements
  - Is insensitive to FEM mesh size
  - Avoids the use of “singular” crack elements. As a result, extensive mesh preparation is eliminated
  - Is computationally efficient due to the use of the node-based displacements and forces, which does not affect the problem size
  - Requires a fracture path to be predetermined based on either: 1) experimental testing; 2) a preliminary GENOA/PFA analysis; or 3) the user experience. The predetermined path can be effectively prescribed using the GENOA GUI
  - Can be used for computing strain energy release rate in linear elastic materials
  - Requires fracture toughness data as input. The fracture toughness test data can be obtained from testing, material handbooks, or from GENOA-FTD.

### Applications/Benefits:

- Efficiently solves crack propagation problems for aerospace, automotive and other structural applications.
- Predicts crack propagation mechanisms in composites.
- Predicts facesheet-core delamination in sandwich materials.
- Provides accurate failure analysis of adhesively bonded joints.
- Detects critical crack propagation and arrest in pipelines.
- Can be applied to interface failure analysis in MEMS (Micro Electro Mechanical Systems).

