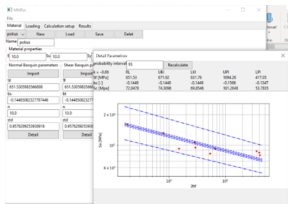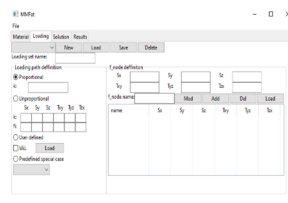# FATAM – tool for multiaxial fatigue lifetime estimation

## Material database module

- Store and manage multiple materials static and cyclic material properties.
- Tool for fatigue properties (parameters of fatigue curves) calculation from measured data in probabilistic form.
- Direct import of material parameters

Loading module

- Store and manage multiple loading scenarios.
- Possibility to define multiple loading paths: proportional loading, nonproportional loading, user defined path and set of "popular" predefined paths.
- Definition of critical point (f_node) in which lifetime estimation is carried on.
- Possibility to manually define f_nodes or import them from FEM simulation.
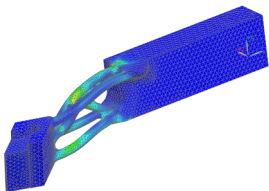
Multiaxial fatigue lifetime estimation

- Multiple multiaxial damage parameters implemented (Findley, McDiarmid, Dang-Van, MDC).
- Modular build with possibility to implement new multiaxial model.
- Various models for shear stress amplitude calculation under nonproportional loading (minimal enclosed circle, rectangular hull, maximal projection)
- Various settings for critical plane search.
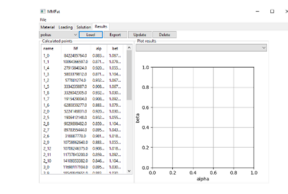
Results and exports

- Basic module for result visualization.
- Possibility to export results in formatted file.

References

Findley WN. Fatigue of metals under combinations of stresses. Trans ASME 1957; 79:1337–8.

McDiarmid DL. A general criterion for high cycle multiaxial fatigue failure. Fatigue Fract Eng Mater Struct 1991; 14:429–53.

Dang Van K, Griveau B, Message O. On a new multiaxial fatigue limit criterion: theory and application. Biaxial and multiaxial fatigue, EGF 3. London: Mechanical Engineering Publications; 1989. p. 479–96.

Margetin M, Ďurka R, Chmelko V. Multiaxial fatigue criterion based on parameters from torsion and axial S-N curve. Frattura ed Integrita Strutturale 2016;10:146–52.

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