imkf Institut für Maschinenelemente, Konstruktion und Fertigung

TECHNISCHE UNIVERSITÄT BERGAKADEMIE FREIBERG
Die Ressourcenuniversität. Seit 1765.

Master thesis!

Implementation of the SWT damage model and critical plane approach in a MATLAB routine

Motivation

The analysis of multiaxial fatigue problems is often performed using the critical plane approach. This approach analyzes the strains on a certain section plane. The plane where the failure criterion reaches the highest damage value is the critical plane. This procedure is implemented in several commercial software codes like HyperLife. Due to the fixed implementation it is not possible to improve the critical plane approach, for example with an enhanced search of the critical plane. Therefore, the critical plane approach should be programmed in MATLAB.

Taks:

- Literature review to the critical plane approach and the strain based damage model of Smith, Watson and Topper (SWT model)
- Familiarization of the fatigue analyses by finite element analysis
- Implementation of the SWT model in MATLAB
- Implementation of the critical plane approach in MATLAB
- Comparison of the results between the commercial code (HyperLife) and the MATLAB routine using easy to handle components and load situations
- Scientific poster as a summary of the thesis
- Documentation (Master thesis)

August 2023

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