



Overview of Innovations in winLIFE 2023

• User Interface

- **Enhancement of the search function** regarding both the ‚Load‘ S-N curves and the ‚Load FKM‘ dialogue
 - Display of the S-N curve numbers
- When copying the projects, the FE data can optionally be copied as well
- When calculating with element stresses, a Max_schad.ele is now written

Load S-N curve

example × Find

Short name ▲	Material number	S-N curve #
▶ E_N_example_3	Materialnummer	48
E_N_example_4	Materialnummer	53
example_41	Materialnummer	95
S_N_example_1	Materialnummer	46

• Container Projects

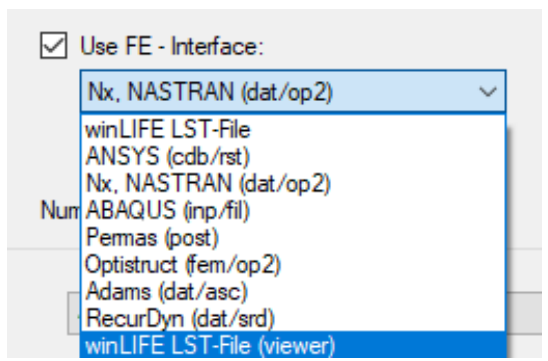
- Temporary window "Calculate partial loads" in container projects no longer closes automatically after the calculation, but has been given a ‚close‘ button
- Speed optimisation through one-time reading of the FE stresses



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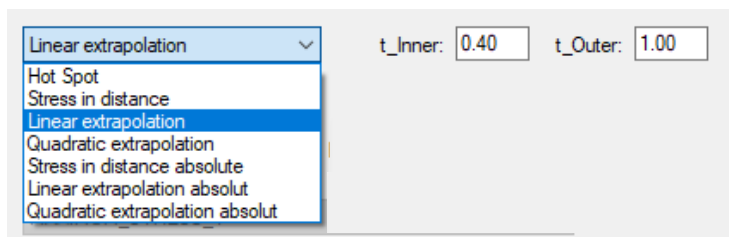
• FE-Interface

- New LST format **winLIFE LST-File (Viewer)**
- FE interface non-linear with RecurDyn generates LST files optionally with plane or with 3D stresses
- Optimised adding of LST files: considers shell stresses top side / bottom side from 2 (several) separate LST files and multi-adding
- Problem with very large node numbers fixed



• Solver

- Support of processor groups in multithreading
- Number of classes of the allocation matrix increased from 40 to 100
- **Classification matrix with independent loads** -> non-linear calculation (see last slide)
- **Structural Stress Concept**
 - Stress in distance **absolute/relative** of sheet thickness
 - Linear and quadratic extrapolation **absolute/relative** of sheet thickness
 - Structural stress concept without FE data
 - Structural stress concept with LST files and node selection
 - Structural stress concept non-linear with and without FE data
 - Structural stress concept with **Findley**





Overview of Innovations in winLIFE 2023

• Viewer4winLIFE

- **New winLIFE interface**
 - Attributes of the LST files can be used imported and exported
- **Attribute sheet thickness:** for shell elements automatic recognition of sheet thickness from the geometry file
- Import of element stresses from LST files - HotSpot method
- Freezing of the legend "Result global min/max" for better comparison of results
- **Shell elements:** hide/show **top/bottom stresses** and export to LST-file,
 - Surface orientation added under element info in the Viewer
- **Animation** from-to..
- Detailed debug output for the calculation of the structural stress
- Displays and views are saved

✓ Debugfile for FE-Export function

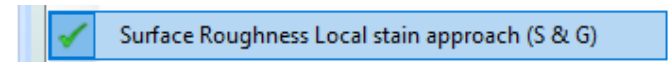
The screenshot shows the winLIFE software interface. On the left is a tree view with categories: Node sets, Element sets, Results, and Nodes. Under Nodes, there are sub-categories: Nodes informations and Nodes attributes. A context menu is open over the 'Nodes attributes' section, with options: New, Edit, Delete, Import, Export, Select, Unselect, Hide top stress at shells (checked), and Hide bottom stresses at shells. Below the menu, a green box highlights the 'Sheet thickness' attribute, with an arrow pointing to the text 'Sheet thickness to sheet thickness attribute'. On the right, there is an 'Animation' panel with radio buttons for 'Stresses' and 'Displacements'. It includes input fields for 'Minimum' (0), 'Maximum' (800), 'Displacement exaggeration factor' (1), and 'Time step' (100 [ms]). There are 'Start' and 'Stop' buttons, and fields for 'Load case number' (18) and 'Load case number from - to' (1 to 20). The background shows a 3D model of a structure with a blue mesh and red arrows indicating stress or displacement.



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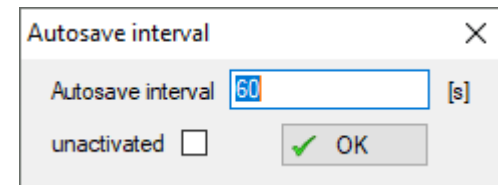
- **FKM**

- With the local concept, a distinction can now be made as to whether the surface roughness is taken into account according to **Siebel&Geier** or according to **FKM Nonlinear**
- Acceleration when using different S-N curves
- Update: Decisive for the degree of utilisation is now only the equivalent degree of utilisation for multi-axial, proportional and synchronous stresses. See FKM section 4.6.3



- **Other**

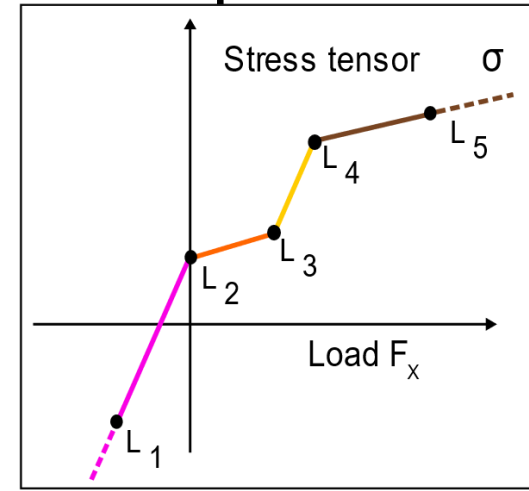
- Example 11 Newly created
- Convert LST file format old --> new
- **Autosave** function with option to set the time interval
- Drag and Drop when creating the **multiple load file**
- Extrapolation of the time with first and last time column of the multiple load file
- **Formula editor** applicable via directories
- Formula editor with modulo ,% operator



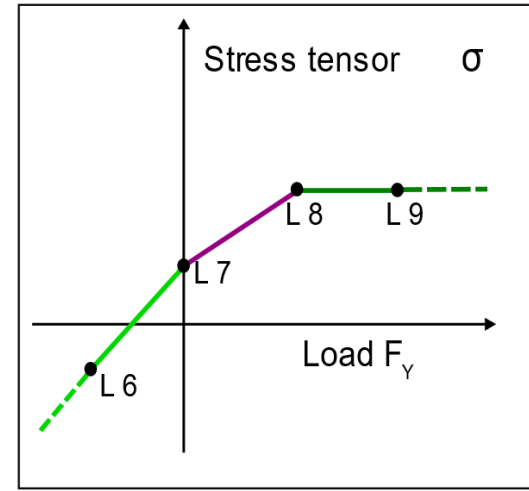


New non-linear Calculation Option with several independent Loads

In the FE calculation, several load points are calculated.
E.g.: for the force F_x the load cases 1 to 5 and for the force F_y the load points 6 to 9. In the calculation the stress components between the load are interpolates



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