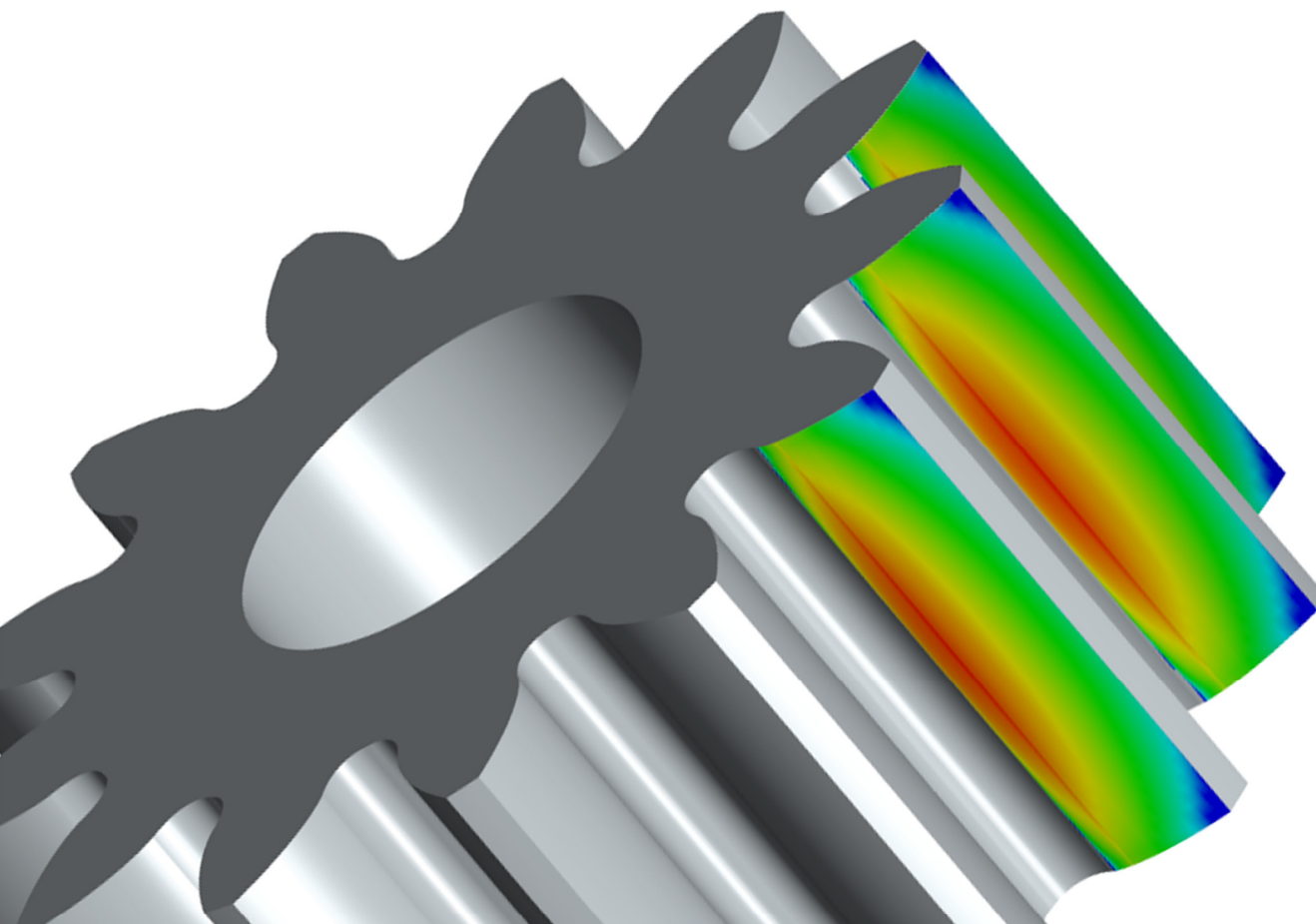


KISSsoft Live Stream Training

Contact Analysis for Cylindrical Gears, Bevel Gears
and Planetary Systems (3 days)

November 10-12, 2020



Day 1 - November 10, 2020

08:30 – 08:45	Welcome
08:45 – 10:10	Face load factor according to ISO 6336-1 (Method C, Annex E) Part 1
10:10 – 10:30	Break
10:30 – 12:00	Face load factor according to ISO 6336-1 (Method C, Annex E) Part 2
Exercises	“Tooth trace modification on a gear pair” “Flank line optimization with load cycles”
16:00 – 17:00	Questions

Day 2 - November 11, 2020

08:30 – 08:40	Summary day 1
08:40 – 10:10	Contact analysis: Theory of contact stiffness calculation; how to use it in KISSsoft
10:10 – 10:30	Break
10:30 – 12:00	Contact analysis: interpretation of results; profile modifications Part 1
Exercises	“Profile modification on a gear pair”
16:00 – 17:00	Questions

Day 3 - November 12, 2020

08:30 – 08:40	Summary day 2
08:40 – 10:10	Contact analysis: interpretation of results; profile modifications Part 2
10:10 – 10:30	Break
10:30 – 12:00	Contact analysis: Planetary and bevel gears
Exercises	“Profile Modification Optimization”
16:00 – 17:00	Questions

Topics in the "Theory" Part

Introduction to the Theory of Face Load Calculation

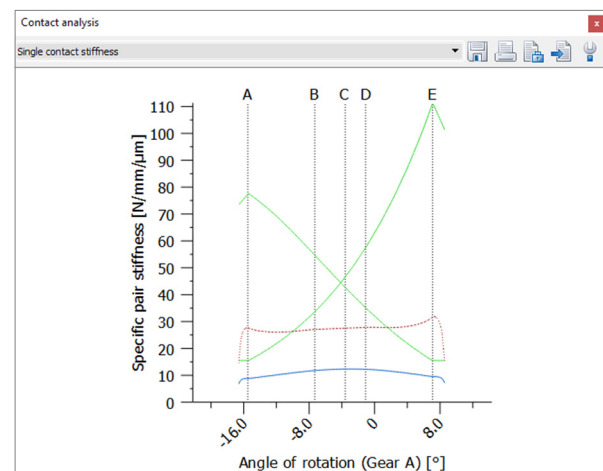
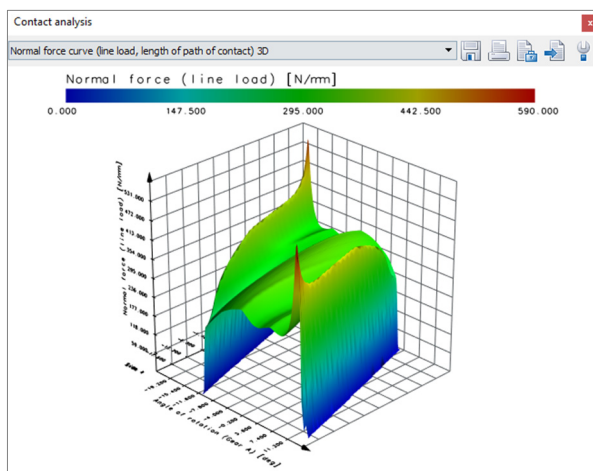
- Face load factor $KH\beta$ according to ISO 6336-1, Appendix E
- Taking into account manufacturing allowances in $KH\beta$ calculation according to ISO 6336-1, Appendix E
- Importance of tooth pair spring stiffness
- Characteristics of tooth pair spring stiffness according to ISO 6336-1
- Use of face load factors in load spectrum calculation

Theory of Stiffness Calculation

- Tooth pair spring stiffness according to the Weber/Banaschek analytical method
- Importance of system, tangent and secant stiffness
- Possible methods for calculating contact stiffness
- Importance of the correction coefficient for Hertzian stiffness
- Differences to the FE approach and comparison with other programs commonly used in Germany
- Defining the slice coupling factor
- Approximation and effects of helical gear teeth
- Defining the border weakening factor and its consequences on the buttressing effect

Interpretation of the most important Results

- Importance and interpretation of the transmission error
- Effect of transverse contact ratio and overlap ratio on the transmission error
- Identification of entry and exit impact
- Meaning of change of normal angle at the beginning of the profile modification
- How to identify and resolve numerical problems
- Importance and interpretation of the progressions of normal force, stress and kinematics



Topics in the "Extended Contact Analysis, Planetary Systems, Sizing and Optimization" Part

Extended Contact Analysis

- Defining the gear/planetary gear unit coordinate systems
- Defining the shaft coordinate system
- Importance of the inclination/deviation error of axis
- Taking the shaft calculation into account
- Problems of consistency in the shaft calculation
- KISSsys as an effective data management tool for designing/analyzing entire multi-stage drives

Contact Analysis with Planetary Gear Units

- Analytical model for planetary gear unit calculation
- Options and limits of planetary gear unit calculation
- Importance of calculating iterative load distribution
- Importance and correct configuration of axis alignment

Contact Analysis with Bevel Gear Units

- Analytical model for bevel gear unit calculation

Interpretation of the most important Results for Planetary Gear Units

- Meaning and interpretation of planetary stage transmission error
- Load distribution for planets

Sizing and Optimization of Modifications

- Defining profile and tooth trace modifications and their effects
- Sizing and optimizing modifications manually
- Sizing and optimizing modifications for load spectra
- How to use modification sizing effectively
- How to use iterative wear calculation