

Planetary gears

Overview

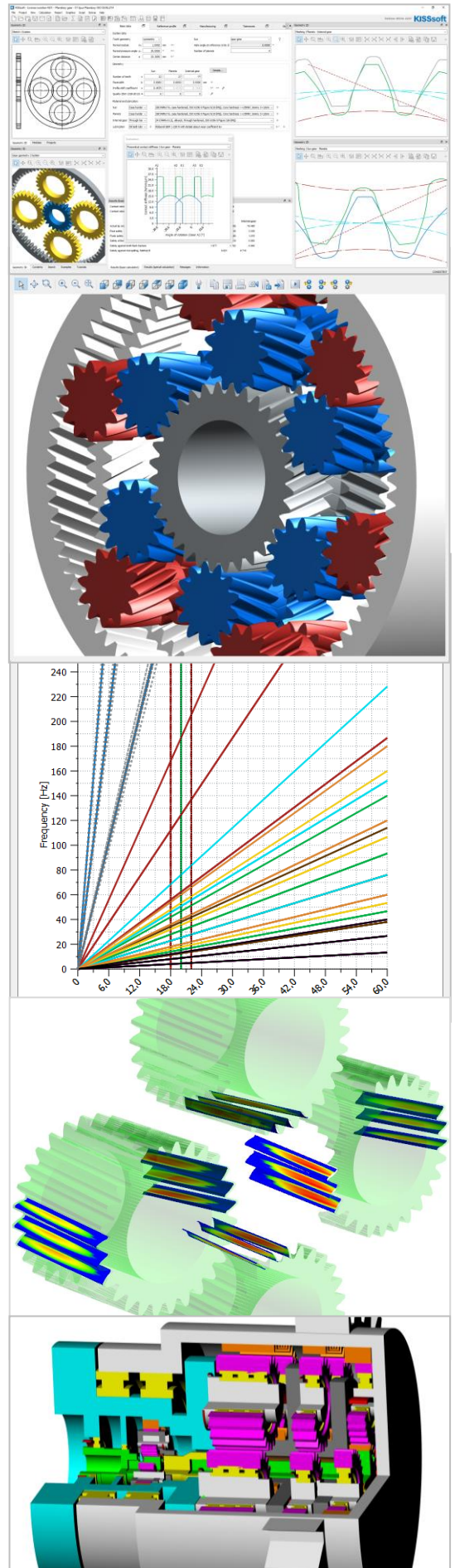
- Based on helical gear calculation modules
- Calculation of planet pin location for non-evenly spaced planets
- Influence of rim thickness of ring gear and planet gears considered
- Assembly check
- Sizing function for load distribution factor along AGMA 6123
- Rough and fine sizing function

Strength rating, planets

- DIN 3990 method B, DIN 3990 method B with YF along method C, DIN 3990 Part 41 (vehicles)
- ISO 6336:2006 and ISO 6336:2019
- Static rating against yield
- AGMA 2001-C95, AGMA 2101-D04, AGMA 2001-D04
- AGMA 6004-F88, AGMA 6011-J14, API 613 :2021, AGMA 6014-B15, AGMA 6015-A13, GOST 21354-87
- Plastic gears along Niemann, VDI 2545, VDI 2545 modified, VDI2736
- BV / Rina FREMM3.1, Rina 2010, DNV41.2, Loyds Register 2013
- ISO 13691:2001 (high speed gears)
- For nominal load or load spectrum
- Planet system reliability
- Micropitting rating along ISO/TS 6336-22, scuffing rating along ISO 6336-20, ISO 6336-21, DIN 3990, AGMA 925
- Flank fracture rating along ISO/TS 6336-4 and case crushing rating along DNV 41.2

Ky calculation

- For systems with perfect pin position or for pins with positioning error
- Quasi-static load distribution neglecting dynamic effects
- Sun may be floating or stationary
- K_Y is calculated for momentary force equilibrium for different meshing positions
- Considering system equilibrium for in-phase and out-of-phase systems
- Phasing check



Planetary tooth contact analysis

FEM calculation of planetary carrier

- Planetary carrier torsion is calculated inside KISSsoft with FEM
- Salome / Code Aster is used as pre-processor and solver, using Python scripts
- Based on parameterized model of the carrier (import of carrier geometry is not directly possible)
- Mesh generation is automatic
- Includes sizing function for planetary carrier geometry
- Results may also be directly imported from FEM results file

Ring gear deformation

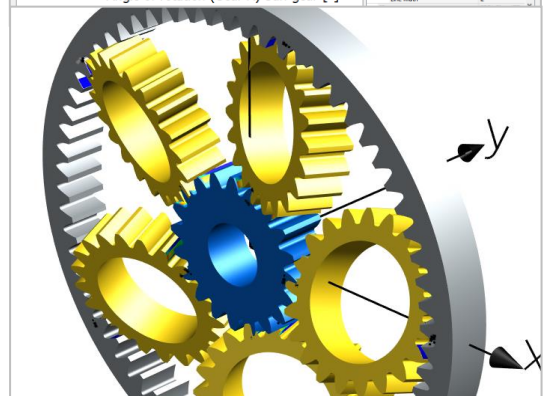
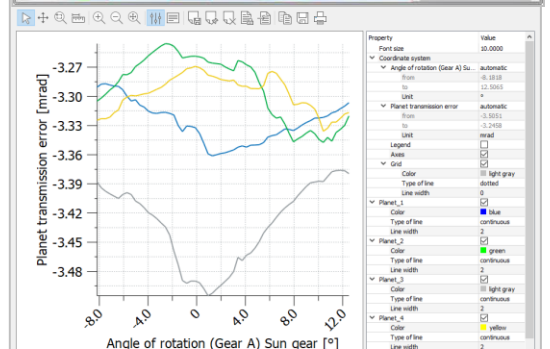
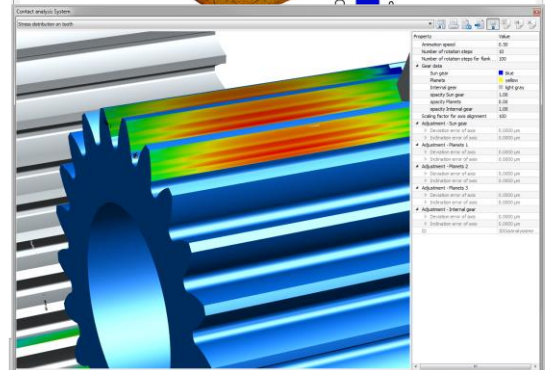
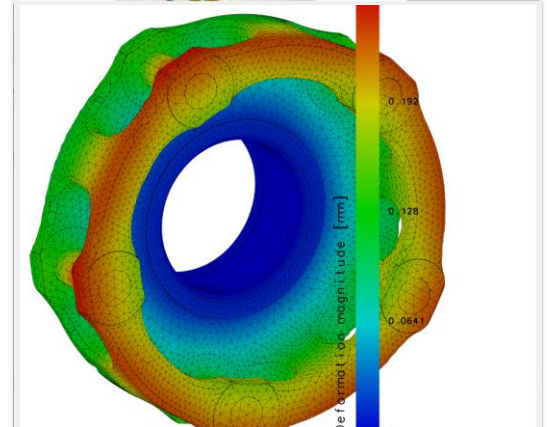
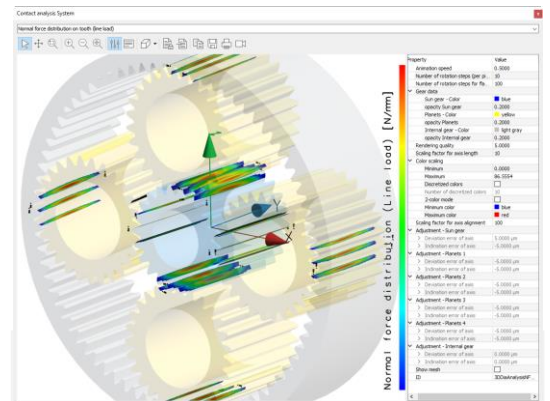
- In case of ring gears supported only on one side, the conical deformation may be considered for the planet – ring gear mesh

Sun gear arrangement

- Floating or fixed sun gear
- In case of floating sun gear, quasistatic momentary equilibrium is calculated

Link to shaft calculations

- Planetary carrier tilting in carrier bearings or due to manufacturing errors may be considered from shaft calculation
- Sun shaft twist, sun shaft tilting may be considered in LTCA with planets
- Planet pin deformation and planet bearing deformations is automatically imported from shaft calculation
- Planetary tooth contact analysis may be integrated into KISSdesign models



Double planet

- Assembly condition and collision check
- Strength rating as for cylindrical gear modules
- 2D and 3D geometry

