KISSsoft Changelog Version 03/2015 - Service Pack 7

KISSsoft - Bearing calculation

SP 7 - **Friction calculation according SKF 2013**
- Until now the curve which defines the drag loss factor VM was splited in 2 lines, we improve the functionality, now it is splited in 4 lines.
- the formula to calculate for the cylindrical roller bearing the sliding frictional variable G_{SL} had an error

SP 7 - **Calculation of four point contact ball bearings**
The inner geometry calculation of four point contact ball bearings was slightly (< 5%) incorrect. This caused some shaft calculation cases to not converge.

KISSsoft - Bolt calculation

SP 7 - **Length of engagement for the bolt thread corrected**
The calculation of the length of engagement for the bolt thread was wrong. Additional we added the correction of the formula for the length of engagement for the bolt thread from the VDI 2230 paper 1:2015 . In the 2015 version of the guideline are the mistakes from the 2014 version corrected, the content of the guideline is the same.

SP 7 - **Alternating stress: the calcualtion of a bolt which was rolled after heat treatment with ND >= 2000000 wasn't correct**
The alternating stress of a bolt, which was rolled after heat treatment, was wrong, if the number of load cycles NL is bigger or equal like 2000000.

KISSsoft - CAD interface

SP 7 - **SolidWorks 2016: worms helix right hand were not anymore generated from KISSsoft**
In SolidWorks 2016 worms with a helix right hand were not anymore generated from KISSsoft through the interface, now this is fixed again. The SolidWorks functionality changed between the versions.

SP 7 - **NX: Generate toothform for bevel gears with arcs improved**
If arc elements are too small to be generated with the NX function, lines are set instead.
With this fix special bevel gears can be generated again in NX.

SP 7 - **Autodesk Inventor: Interface to Autodesk Inventor 2017**
Interface to Autodesk Inventor 2017 is implemented

SP 7 - **ProE/ Creo: extra dll for Creo 3, when Creo 3 is installed on a special drive**
If Creo 3 is installed on a special drive (f.e. D: instead of C:) the dll from the installation isn't working. If you use the 'Protk_EditGear_Creo3_64bit_otherDrive.dat', the extra dll will be automatically connected.

KISSsoft - Gear calculation

SP 7 - **Hardness ratio factor CH in AGMA6014**
When the hardness of the surface hardened pinion was introduced in HBW (in stead of HRC or HV) a

very small error in CH occurred.

SP 7 - **Fine sizing procedure, using Cutter-List**
The 'Use of a cutter list' option was not working properly iin the fine sizing. This is fixed.
Furthermore, for inner gear pairs, when a solution was selected, the tool of the inner gear was also set as a cutter, which is not working then when running the solution. Now the reference profile (or pinion like cutter) data of the inner gear is left unchanged.

SP 7 - **Unicode in measurement grid report**
The unicode encoding was not set properly in the measurement grid report and showing corrupted texts in some languages such as Russian.
Now the problem is fixed.

SP 7 - **Entering gear generation process for tooth form with diametral pitch**
The problem occurs only if the input is given as diametral pitch.
In the tab tooth form, it's possible to enter a cutter tool with shifted generation (diametral pitch of cutter differs from generated gear). In that case, when the input is given as length, the error occured.

SP 7 - **Rough sizing of Planet stages: Weight shown in the result list corrected**
Planet stages: The Weight shown in the result list of the fine sizing was wrong. Also when selecting a solution, the transmitted face width was wrong in some cases.

SP 7 - **Speed of load spectrum in planetary gear calculation**
In the load spectrum calculation of planetary gear, when the negative speed is defined for the second element, the speed for the load bins are always showing the nominal speed in the report. This is only the error in the report and the calculation for the safety factor and damage had no problem.

SP 7 - **Wrong number of slices for face load factor calculation**
The number of slices used to split the gear for the face load factor (KHbeta) calculation according to ISO6336-1, Annex E, was wrong. It always used the accurecy setting of the contact analysis instead of the accuracy setting of the KHbeta calculation. This is fixed.

SP 7 - **Gears with Duty Cycles improved**
We had cases with planetary gears and duty cycles having very high KHb-values, where the calculation had iteration problems. This is improved.

SP 7 - **Tip alteration not considered in warning message**
An error message appears, when a non-topping pinion type cutter is chosen that doesn't have enough height to be non-topping. However, the tip alteration was not considered correctly and an error could show up if in fact the input was correct.

SP 7 - **PET material DAT file missing**
Z014-PET_VDI2736.DAT file was missing in the installation.

SP 7 - **Fine sizing of planetary gear with contact analysis**
The "With calculation of the transmission error" option in the fine sizing of planetary gears was not working and giving no results.

Now the problem is fixed.

SP 7 - **Topological modification for internal gear**
The topological modification for internal gear was not working correctly caused by the wrong assignment of the tooth height factor.
The problem is fixed now.

KISSsoft - Interference Fit calculation

SP 7 - **Diameter increase of the hub outside diameter was wrong calculated**
The diameter increase of the hub outside diameter was calculated with the joint diameter instead of the outside diameter.

SP 7 - **The tolerance field of all inner diameters were not read correctly for additional multiple interference fit**
If you define additional multiple interference fits the tolerance field (as H7) of all inner diameters were not read correctly and set, so the the allowances were wrong.

KISSsoft - Shaft calculation

SP 7 - **Shaft with worm gear - data from Z80 file**
If the worm and worm wheel in the shaft calculation were reading their operational data from a Z80 file, and the gear data in the Z80 file were indirectly changed, the shaft calculation ignored this change and used the original, unmodified gear data. This could happen, for example, if KISSsys modified the worm pair parameters before the shaft calculation was executed.

SP 7 - **FKM-Guideline: cross section spline and safety factor jm**
- If you set an cross section 'Spline' with a profile according DIN 5480, the wrong notch effect coefficient was calculated.
- The input field safety factor jm was hidden, now you can input the value again, if you set own input.
- If you have an cross section 'Spline' the root diameter is used to calculate the notch radius (before the outside diameter)

SP 7 - **DXF import of outer contour**
There was an error when reading the shaft's outer contour from a DXF file: the surface roughness of every cylindrical/conical element was not set to its default value. This caused the strength calculation to fail (the bending line results were unaffected).

SP 7 - **Tooth trace modification: improvements for iterative load distribution**
In the tooth trace modification calculation, when the iterative load distribution method was selected, there were cases for which the calculation did not converge (especially for these where the expected load distribution was almost constant and KHbeta ~= 1).

SP 7 - **FKM-Guideline: the plastic notch factor npl for surface treated parts were according old guideline**
The plastic notch factor npl for surface hardened parts was according the old guideline (npl was always 1).
Since the 6th edition (2012) this factor is defined with the same formulas as for the parts without a surface hardening.

KISSsoft - Shaft-hub-connections

SP 7 - **Niemann method: hardness influence coefficient fh for nitrided material was wrong**
For the strength calculation according Niemann the hardness influence coefficient fH for nitrided materials was wrong.

KISSsys - General

SP 7 - **User defined offsets in the calculation with housing deformation.**
When running KISSsys calculations including housing deformation and requesting to take into account the initial bearing offsets, these offsets were not added correctly in the case if the maximum number of iterations was reached.

SP 7 - **Reading of ABAQUS reduced stiffness matrix with 4 master nodes.**
Sometimes there was an error reading an ABAQUS reduced stiffness matrix with 4 master nodes. The matrix was not read and the calculation could not proceed further.

KISSsoft Changelog Version 03/2015 - Service Pack 6

KISSsoft - 3D geometry (STEP interface)

SP 6 - **3D step model of cylindrical gears**
The 3D modeling of cylindrical gears with an involute starting exactly at the base circle (e. g. constructed involute), couldn't be generated or even led to a crash.

KISSsoft - Bearing calculation

SP 6 - **Lifetime of ball bearings with inner geometry**
There was an error in the lifetime calculation of ball bearings when the inner geometry method was used, causing differences up to 10%. The shaft bending line results and the bearing stiffness were unaffected.

SP 6 - **Taper roller bearing: clearance influence on stiffness**
The taper roller bearing calculation with inner geometry had the following errors: In some cases the influence of the temperature on the clearance of taper roller bearings was not taken into account correctly, and for the pressure angle the value on the outer ring instead of the mean value was used. This can have a significant effect on the bending line.

KISSsoft - CAD interface

SP 6 - **SolidWorks: Interface to SolidWorks 2016**
Interface to SolidWorks 2016 is implemented.

KISSsoft - Gear calculation

SP 6 - **VDI2737, Safety against crack initiation**
Safety against crack initiation according VDI2737 is only useful for hardened surfaces. The safety is not displayed anymore for not hardened surfaces.

SP 6 - **Form diameters in tooth form report**
In the tooth form report, when the form diameter could not be calculated (e. g. for cycloid), the root form diameter d_{Ff} was shown with the same value as the root diameter d_f (and the same with tip

form diameter and tip diameter). Now, no value is shown if it couldn't be calculated correctly.

SP 6 - **Warning message in tooth form calculation**
In the case of displaced generation, a warning message is given during the tooth form calculation, if the given values do not generate the same base circle as in the main calculation.

SP 6 - **Tooth form calculation on internal gears with topping tool**
In the tooth form calculation for internal gears, the tip and root radius were not considered correctly, when using the input reference profile with topping tool. The tip radius was mistakenly put as root radius and it was not possible to generate a tip radius.

SP 6 - **KISSsys wasn't able to calculate contact analysis with pitch error**
It was not possible to calculate contact analysis with pitch error from KISSsys. This is fixed now.

SP 6 - **Wrong flank considered in contact analysis.**
The contact analysis considered the wrong flank for 3 and 4 gear chains. This is fixed now.

SP 6 - **Messages in fine sizing**
In the fine sizing of cylindrical gears, no message was shown up since patch E.
Now the problem is fixed and the messages are shown correctly.

SP 6 - **Problem in contact analysis with pitch error**
The contact analysis had in some cases, when more than one pitch is calculated (when single normal pitch deviation was applied), problems handling the calculation results. This problem appeared in mixed-up results, e.g normal force. Because of this fix, some results may change slightly.

SP 6 - **Fine sizing in bevel gears**
In the fine sizing of bevel gears, the input to vary d_{e2} is shown, but is not performed. The given values of m_n were than varied in the calculation.

SP 6 - **Fine sizing procedure: Wrong youngs modulus used with plastic gears in the contact analysis**
When in the fine sizing the contact analysis is activated, then for plastic gears the LTCA was calculated with youngs modulus as stored in the data base (and not as defined in the specific material dat file).

SP 6 - **Refresh of tooth form in geometry manager**
The tooth form graphics in the geometry manager was not refreshed when the main window was consistent.

SP 6 - **Wrong mean root stress in the results table of the contact analysis**
The contact analysis report documented the wrong mean root stress in the results table. This is fixed.

KISSsoft - General

SP 6 - **Unit conversion for area moment of inertia fixed**
The conversion of the unit for area moment of inertia did not work in all cases.

SP 6 - **Hidden material cause numerous warnings**
When some material data sets were hidden, a click on the plus button next to material selection lists caused warnings per hidden material. This behavior was fixed.

SP 6 - **Dynamic User Interface: Error in Material and Lubricant dialogs**
When using the plus button for material or lubricant selection sometimes input data in the basic data tab was set back to a former value.

SP 6 - **Absolute Path in Included Graphics in reports**
The report generator now also allows to specify an absolute path to a bitmap file for inclusion into a report.

KISSsoft - Graphics

SP 6 - **Export of profile diagram to .dxf**
When exporting the profile diagram to a dxf-file, the file was damaged and could not be shown in all dxf-viewers.

SP 6 - **Error in graphic of hertzian stress with AGMA calculation method and contact analysis**
In case of calculating contact analysis with AGMA calculation method (set in tab 'Rating'), the 3D-Graphic of hertzian stress was displayed incorrect.

KISSsoft - Shaft calculation

SP 6 - **Import from DXF**
The import of a shaft contour from a DXF file was not working. This is fixed now.

SP 6 - **Modeshape of shafts with infinite stiff supports**
The modeshapes of shafts with infinite stiff supports were calculated incorrectly, even though the eigenfrequencies calculation was correct. The correction has an effect only on modeshapes.

SP 6 - **Lifetime of unloaded bearings or bearings with speed zero**
The reference lifetime of a bearing, calculated with the inner geometry, was 0 when the bearing was completely unloaded. This caused problems in load spectrum cases, so that the bearing lifetime for the whole spectrum could not be calculated. Instead of 0 we now set the lifetime to 1'000'000 hrs. The same problem occurred with bearing having speed 0 rpm, also for this case lifetime is no now set to infinite.

SP 6 - **The admissible sum of Miner Dm wasn't integrated correctly**
If you defined an own woehler line, the admissible sum of Miner Dm (damage sum) wasn't correctly integrated in the shaft strength calculation. The sum Dm was always overwritten with the default value.

SP 6 - **Eigenfrequencies calculation improvement**
It was found that (in some cases) some low eigenfrequencies were missed by the calculation. This is corrected now. Some rigid body modes may be missed due to this correction.

SP 6 - **Bearing report graphics**
The graphics of the bearing report in the shaft calculation were showing always the results for the first bearing.

SP 6 - **Documentation of power loss element**
The documentation of the power loss element was made with wrong power (the torque was correct).

SP 6 - **Axial offset with classic bearing calculation in new solver**
When the axial offset of the outer ring was larger than the axial clearance, effectively creating a pretension, the results of the shaft calculation were wrong. This occurred only in the new solver and only for bearings that were calculated with the classic bearing method.

SP 6 - **Shaft mass moment of inertia**
When the shaft geometry contained conical elements, the shaft's moment of inertia was inaccurately calculated.

SP 6 - **User defined stiffness of classic rolling bearings**
In some cases which when the classic bearing calculation method was used and the stiffness was defined from the user, the new shaft solver didn't apply the user stiffness to the bending line, but an instead an infinite stiffness value was used. This affected the bending line and all subsequent results.

KISSsoft Changelog Version 03/2015 - Service Pack 5

KISSsoft - Bearing calculation

SP 5 - **Oil density affecting aISO and ec contamination factor**
In a legacy edition of ISO 281, the oil density affected the life modification (aISO) and the contamination (ec) factors, through the viscosity ratio (κ). In order to stay up to date with the latest version of the standard, this legacy influence is removed. This effect was observed only when the oil density was different from 0.89 kg/dm^3.

SP 5 - **Documentation of bearing local stiffness dFr/dur**
The documentation of the (local) bearing stiffness dFr/dur was wrong when the bearing had clearance. This does not affect the calculation results.

SP 5 - **e, X1/X2 and Y1/Y2 values of ball bearings for low axial forces**
The factors e, X1/X2 and Y1/Y2, which are used for the classic bearing calculation, are determined at runtime based on the contents of the files W05-100.DAT, W05-101.DAT, W05-102.DAT, W05-103.DAT and W05-104.DAT (they are found in the kiss/dat folder), and the operating clearance of each bearing (eg. normal clearance, C3 or C4). The parameter which is used to interpolate intermediate values from these files is f0*Fa/C0. There was an error in the contents of these files for the lowest value of f0*Fa/C0 (f0*Fa/C0 = 0), therefore the interpolation of e, X1/X2 and Y1/Y2 produced wrong results if the axial force was sufficiently small enough.

KISSsoft - Gear calculation

SP 5 - **Manufacturing errors in planetary gear systems**
In case of face load factor calculation according to ISO6336-1, annex E, with manufacturing errors in planetary gear stage, the text and order of manufacturing errors in the gap and load distribution graphic were wrong. This is fixed now.

SP 5 - **Woehler line graphic changed**
Following the ISO6336, we changed the display of the admitted stresses σFG, σHG to σFP, σHP. (σFP

= σFG/SFmin)
So now, if the stress σ crosses σP, than the required safety is not attained.

SP 5 - **Moment of inertia for planetary gear system**
The moment of inertia referenced to the sun gear in planetary gear calculation did not consider the rotation of the planet gears around the sun.

SP 5 - **Normal section of tool for hobbing cutters with displaced generation**
When considering a hobbing cutter with displaced generation (normal module and pressure angle of the tool different from the gear) the graphical display of the normal section of the tool was incorrect (the transformation to normal section considered the pressure angle of the gear).

SP 5 - **Contact analysis for racks**
For racks with normal module bigger than 2 mm, the contact analysis did not work and the program could crash.

SP 5 - **Problem in contact analysis with 3 and 4 gear chains with shafts**
The Contact analysis for 3 and 4 gear chains with shafts did not work because it wasn't able to match the gears defined on the shafts to get the correct bending line. This is fixed now.

SP 5 - **Wrong rotation speed of bevel gears in contact analysis considered**
The rotation speed was considered wrong in contact analysis of bevel gears. This is fixed now.

SP 5 - **Tooth form calculation of crown gears**
When calculating the tooth form while allowing geometry errors, it was possible that the program crashed.

SP 5 - **Add on for Face load factor KHb according ISO6336, Annex E**
Current situation:
KHβ, calculated along ISO 6336-1, Method C: Factors KA, Kv and Kγ are always considered in the tooth and the shaft deformation. The shaft deformation is calculated with a torque T, equal to nominal torque (as defined in tab “Rating”) multiplied with said factors, T=Tnom*KA*KV*Kγ. This is in line with ISO 6336-1, chapter 7, eq. 39 and 41.

KHβ, calculated along ISO 6336-1, Annex E: Factors KA, Kv and Kγ are always considered in the tooth deformation but not in the shaft deformation. The shaft deformation is calculated with a torque T, equal to nominal torque (as defined in tab “Rating”), T=Tnom.

New situation with patch E:
KHβ, calculated along ISO 6336-1, Method C: no changes

KHβ, calculated along ISO 6336-1, Annex E: The user can choose whether the shaft deformation is calculated with T=Tnom*KA*KV*Kγ or T=Tnom*KA*Kγ or T=Tnom*Kγ or T=Tnom.

KISSsoft - General

SP 5 - **Report: temperature conversion from °C to °F was wrong**
The conversion of the temperature from °C to °F was wrong. In the imperial report the value for °F was printed in °C.

SP 5 - **Color RED in report**
The color tag was not working in the report templates.

SP 5 - **Database: Bearing data C and C0 for double tapered roller bearings for TIMKEN were wrong**
The tables for tapered roller bearings (paired) (X, TDI) and (O,TDO) in the database W000.kdb (bearings and shafts), contain wrong values for the factor C and C0 for TIMKEN bearings.
IMPORTANT: We can not replace the database in the patch, because then user inputs would be overwritten. See on the patches side of www.kisssoft.ag for -> extra download file with a description.

KISSsoft - Graphics

SP 5 - **Inverted contact line and contact pattern graphics**
The contact line and contact pattern graphics of bevel gear contact analysis was displayed inverted. This is fixed now.

SP 5 - **Graphics from graphics list were wrongly shown in the report**
In some cases the graphics added to the graphic list had wrong properties (like center distance) which lead to a wrong graphic attached to the report. This is fixed now.

KISSsoft - Shaft calculation

SP 5 - **Axial equilibrium of shafts**
In some rare cases, and when bearings/supports with axial clearance were used, the shafts found a wrong equilibrium in the axial direction. This was happening only with the new solver (i.e. the 2013 solver showed the correct behavior).

SP 5 - **Torque balance warning with connecting general supports**
In some cases, when multiple coaxial shafts with connecting general supports which constrained rotation around y were used (ry = 0), and in addition the shaft speeds were not given as input (speed flag was unset), the calculation was producing wrong results after the second consecutive calculation (and giving a warning that the torque is not balanced). This is fixed now.

SP 5 - **FKM-Guideline: Faktor KBK for load cycle calculation according Miner was wrong in some cases**
The factor KBK for load cycle calculation according Miner was calculated with the formula from the FKM 5th edition, in the 6th edition is this formula a little bit different. Also the value for the factor DM is changed.

KISSsoft - Splines calculation

SP 5 - **Splines with topping tools**
Topping tools are not considered in ISO or ANSI standards. The tip diameter allowances are defined according the rules in the standards. A new error message will show up in this case.

But if geometry according ISO or ANSI with ‘Own input’ is selected, then topping tools can be used, the tip diameter allowances will be calculated correctly based on the geometrical rules for topping tools (but will not correspond to the values proposed by the standards).

KISSsys - General

SP 5 - **Initial offsets in housing deformation.**
In the calculations of housing deformation, the initial offsets defined by the user were added in a wrong way.

SP 5 - **Corrections in the handling of general supports during housing calculation**
1. Correction for the case when both a clearance and an offset is defined for a general support
2. Correct use of the units of force and clearance of general supports
3. Inclusion of general supports in the reset, save and restore functionality of offsets

SP 5 - **Added a variable that can be used to control the maximum number of iterations in the housing calculation**
The maximum number of iterations in the housing calculation could not controlled by the user. A new variable is added in the housing element that can be used to set this number.

SP 5 - **Addition of function to retrieve bearing offset results in housing calculation**
The bearing offset results derived from a housing calculation could only be entered in the model manually if needed.

SP 5 - **Improvement: Load spectrum template in KISSsys**
Until now, the load spectrum template in KISSsys was always using absolute values in speed, torque, and power for gear load spectrum calculation to give conservative results.
Now the sign of the speed and torque are assigned correctly according to the kinematic condition, and thus the sense of rotation and the loaded flank can be considered.
So, the user can do more detailed control on the calculation by using the settings for "Tooth flank for load spectrum" and "Tooth root for load spectrum" in KISSsoft gear calculation.

KISSsoft Changelog Version 03/2015 - Service Pack 4

KISSsoft - CAD interface

SP 4 - **SolidEdge: Interface to ST8**
Interface to Solid Edge ST8 is implemented.

SP 4 - **NX-interface: set expressions in NX is working again**
The functionality which you can use to define output variables in the file Z10GEAR1CAD.rpt, which are set then as expressions in NX, is working again.

KISSsoft - Gear calculation

SP 4 - **Shows only the nominal stress curve when the load spectrum flag is not set**
When the load spectrum is defined but the flag for the consider load spectrum is not set, only the nominal stress curve will be shown in the Woehler lines graphics.

SP 4 - **Allowable Unit Load in AGMA**
Allowable Unit Load in AGMA 2001 & 2101 was calculated with SFmin = 1.0; now (eq. 16 in AGMA2001) we display Uat including SFmin.

SP 4 - **3D-graphics in report**
KISSsoft crashed, when trying to attach a 3D graphic to the report. Now the 3D geometries can be

shown in the report again as usual.

SP 4 - **Convert hfP0 of pinion type cutter**
The conversion for the dedendum height factor for topping pinion type cutters was not working for conversion from tip diameter of gear and was resetting to the old values, when pressing calculate. Now the conversion can be done for all inputs correctly.

SP 4 - **Rounding in axial section for crossed helical gears**
Improvement: For crossed helical gears, the choice of rounding was done always in the transverse section. Now it's possible to specify, if the rounding should be done in the transverse, axial or normal section.

SP 4 - **Gear pump: FFT of oil inlet**
In the graphic for FFT of oil inlet in gear pumps, the display was incorrect and different if the graphic was called from graphic list or from report.

SP 4 - **Bevel gear contact analysis: Error in results of transmission error**
In some cases the results of transmission error of bevel gear contact analysis where presented (graphic and report) wrongly.
This is fixed now.

SP 4 - **Number of teeth with decimal numbers**
The number of teeth with decimal numbers were set back to integer values when the sizing button for profile shift coefficient is used.
Also, the manufacturing data report was always showing the values in integer.
Now, both the problems are fixed.

SP 4 - **Fine sizing of hypoid gear**
1. The pressure angle could not be changed in the fine sizing of hypoid gears because the pressure angles for drive and coast sides are different.
Now both values are set to the same value as the nominal pressure angle, and the sizing proceeds without any problem.
2. The calculation of transmission error is disabled in the fine sizing of hypoid gears, as the contact analysis is not available.

SP 4 - **Worm Gear according AGMA 6034-B92**
We were informed on 23 june, that the AGMA comitee reconsidered his decision which we implemented in Patch C, now the equation C.9 for the friction coefficient is again as it was.

SP 4 - **Measurement grid report for cylindrical gears**
In the measurement grid report for cylindrical gears, the lengthwise coordinate was wrongly set.
Also, the left flank data was always using the right flank data.
Both problems are fixed now.

SP 4 - **Safety for Micropitting: Also calcualted when resitance following AGMA is used**
Improvement: Safety for Micropitting (according ISO TR 15144) is now also calculated when an AGMA standard is used for bending / pitting. Note that in the definition of the oil parameters the load stage for Micropitting must be set, otherwise the safety will not be calculated.

SP 4 - **Approximation of equivalent deviation and inclination**

Improvement: The face load factor calculation of cylindrical gears considering shafts is now extended with a approximation of an equivalent 'Deviation error of axis fsigmabeta' and 'Inclination error of axis fsigmadelta'. This additional information can be found in the face load factor report.
As calculations using shafts are time consuming, using the equivalent deviation can be very helpful, when many variants are checked.

SP 4 - **Tooth form calculation with low number of teeth**
In the cylindrical gear calculation with a low number of teeth (typically 3 or smaller), the tooth form calculation could lead to a missing root, especially in cases with deep roots and big rounding of the tool.

SP 4 - **Tooth form report: Normal tooth thickness at tip cylinder**
In some cases, the value of the normal tooth thickness at tip cylinder [san] from the tooth form calculation was inaccurate. The problem appeared more frequently with internal gears.

SP 4 - **Contact analysis and KHb calculation with deflection from shaft files**
In the window 'Axis alignment' when deformation is used from shaft calculation, the option 'Gears' is now always set to 'Treated as defined in the shaft calculation'. Other choices are not considered by the software actually. The functionality will be implemented in version 2016. In shaft calculations we recommend to use the option 'Gears mounted by interference fit, with stiffness according ISO', which gives the most realistic results.

SP 4 - **Damage results**
High damage results (in life time calculations) are now printed as 9999.99 % if they are 9999 or higher. If lifetime is 0, then damage is also displayed as 9999.99.

KISSsoft - Graphics

SP 4 - **Display of axial section**
In the tooth form graphic, the number of teeth that can be displayed was limited to the number of teeth in the calculation. That meant, that e.g. in worm gears with only 1 tooth, only one pitch could be displayed in the axial section. This was changed, now 7 teeth can be displayed.

KISSsoft - Shaft calculation

SP 4 - **Strength calculation (FKM) with axial pressure/tension stress**
In special cases when the bending moment is not alternating, then the mean bending stress (Sb,m) is not equal 0. In this case according FKM guideline it is not clear in the Smith-Diagram on which side (mean comparative stress positive or negative) the permissible amplitude has to be selected. Because of this, we calculate the safeties at first with a positive mean bending stress and then with a negative stress. As result we use then the case with the smaller safety (worst case). You will see in the report σbm with a positive or negative sign.

SP 4 - **Housing roughness effect in bearing clearance**
The roughness of the housing should affect the change in the bearing clearance of inner geometry bearings, by having an effect on the press fit between the bearing ring and the housing (reducing the interference). This effect was not taken into account.

SP 4 - **Setting for shaft calculation 'Gears as load applications only'**
The setup for the input 'Gears' in tab 'Basic data' is changed from 'Gears as load applications only' to 'Gears mounted by interference fit, with stiffness according ISO'. This gives more realistic results for

the tooth trace modification calculation (KHb).

SP 4 - **Error introduced in patch C, related to bearing life Lnrh**
In patch C, related to fix "Basic bearing life Lnh was influenced when Lnmh > 1'000'000", an error was accidentally introduced which affected the bearing classic lifetime when a load spectrum was used and the modified lifetime checkbox was unchecked. This is now fixed and the (introduced) error removed.

KISSsys - General

SP 4 - **Import of a symmetric stiffness matrix from ABAQUS.**
Improvement: KISSsys can now import an ABAQUS symmetric stiffness matrix for a housing element.

KISSsoft Changelog Version 03/2015 - Service Pack 3

KISSsoft - Bearing calculation

SP 3 - **Basic bearing life Lnh was influenced when Lnmh > 1'000'000**
The influence of the life modification factor aISO and the reliability factor a1 is not included in the calculation of Lnh, and they are only used in the calculation of the modified lifetime calculation Lnmh = a1*aISO*Lnh. Lnh is independent of the lubrication and impurity conditions, however our results were showing a changing Lnh value when Lnmh is larger than 1‘000‘000 and the lubrication conditions changed.

KISSsoft - Bolt calculation

SP 3 - **Admissible pressure for extension sleeves**
We added the inputs for admissible pressure and surface roughness for extension sleeves.
Now the pressure will be calculated under the bolt head or nut, if you have a extension sleeve.

KISSsoft - Gear calculation

SP 3 - **Wrong consideration of GHV misalignment at contact analysis**
The bevel gear contact analysis did not consider the GHV misalignment correctly. This is fixed now.

SP 3 - **Tooth Flank Fracture Graphic**
As the formulas for Tper, Teff and AFF should not be used for y < bh (according ISO DTR 19042), we display now the values only for y >= bh in the graphic.

SP 3 - **Error message concerning Cutters with too big rofP0***
In version 2015 we added an advanced check of rofP0* of cutters.
We changed now the error message, which checked if rofP0* of a cutter is too big.
a) The message read 'roaP0*' instead of 'rofP0*'.
b) If the message showed a negative value for max rofP0*, the information 'Reduce hfP0*' is added. Because in this case hfP0* must be reduced.
c) The message is correct, but nothing happens if the tool is not topping. So in this case the message appears as a warning only.

SP 3 - **Tooth thickness at form diameter dFa**
Tooth thickness at form diameter dFa was corrected. Not always all possible tolerance combinations were used to calcualte the thickness sFan.e/i. In these cases sFan.e is now bigger and sFan.i smaller

than before. Sometimes also max and min values were inverted.

SP 3 - **Error in face load factor calculation with high difference in facewidth**
In case of face load factor calculation with shafts, the bending deformation of both shafts was distributed wrong if the facewidth of both gears differed.
This led to a minor error for normal gear calculations where the facewidth is not differing too much.
In cases of high difference the calculated face load factor is too high.
This is fixed now.

SP 3 - **Worm Gear according AGMA 6034-B92**
I were informed from the AGMA comitee about a printing error in equation C.9 for the friction coefficient. The term +0.12 should be removed.

SP 3 - **Sizing of tip rounding of hobbing cutter**
The sizing of the tip rounding for the hobbing cutter was wrong, when the "Tooth thickness factor reference line" was not the standard value.

SP 3 - **Selection of hobbing cutter from database**
'Tooth form' tab: When an own database of hobbing cutters was added, the dialog for selecting the database didn't show the correct entries.
The problem occured when adding the step "Manufacture cylindrical gear with a gear generation process (cutter, grinding wheel)" in the tab 'Tooth form'.

SP 3 - **Required safeties for methods according AGMA or Plastic**
When service factors or safety factors not depending on size are introduced for AGMA or Plastic calculation methods, then these factors were not used for lifetime calculation or torque layout; instead the factors for ISO/DIN were used. This is fixed now.

KISSsoft - General

SP 3 - **Reset frequency in the load spectrum**
When the user clicks "Remove all load stages" button in the load spectrum definition window, the frequency is reset to 1% and causes an error, that the sum of the frequency is not 100%.
Now it's reset to 100% automatically. The fix is applied to the gear and shaft calculation.

KISSsoft - Graphics

SP 3 - **Wrong contact pattern graphic at bevel gear contact analysis**
The contact pattern of bevel gear contact analysis was wrong drawn at the contact pattern and contact line graphic. It also did not consider coast and drive side in contact. This is fixed now.

SP 3 - **Results of contact analysis on 3D tooth**
For 3 and 4 gear chains, the graphics to show the results along the 3D tooth were not working for the second or third pair.

SP 3 - **Graphical representation of path of contact**
The graphical representation of the path of contact was wrong for 3- and 4-gear trains (left flank contact showed up as right flank contact). This is fixed now.

SP 3 - **Saving manufacturing drawing as dxf-file**
The manufacturing drawings that was saved as dxf-files were not readable for most viewers. The

issue has been resolved.

KISSsoft - Shaft calculation

SP 3 - **Added Drive/Coast info in the shaft report**
For bevel gears it is important to know, therefore we added in the shaft report the info, if the bevel/hypoid is runing in Drive or Coast mode.

SP 3 - **Strength calculation (DIN743) with axial pressure/tension stress**
In very special cases, when the bending moment is not alternating, thren in a cross section the mean bending stress (σbm) is not equall 0. In this case according DIN743 it is not clear in the Smith-Diagram (DIN 743-1, S.21, picture A.5) on which side (mean comparative stress positive or negative) the permissible amplitude has to be selected.
Because of this, we calculate the safeties at first with a positive mean bending stress and than with a negative stress. As result we use then the case with the smaller safety (worst case). You will see in the report, where σbm is displayed, σbm with a positive or negative sign.

SP 3 - **Axial stiffness of classic bearings for the eigenfrequency calculation**
The axial stiffness of bearings (onlly when the classic calculation method is used) was not transferred properly to the dynamics calculation. This resulted in the wrong axial eigenfrequency and eigenmode, however the static results (bending line) were not affected.

KISSsys - General

SP 3 - **License check for efficiency template**
The license checking for efficiency template was wrong and didn't allow the efficiency and thermal rating calculation even the user has the right.
Now the problem is fixed.

SP 3 - **Correction in the limit of number of nodes in importing an ABAQUS reduced stiffness matrix in a housing.**
When importing a reduced stiffness matrix generated by ABAQUS in a KISSsys housing element, there was an error when the number of nodes in the matrix was higher than 9.

SP 3 - **3D View of planetary gear**
The following improvements are made to the display of the planetary gears in KISSsys 3D viewer:
- The planets could not be hidden once we showed them. Now, you can show and hide the planets.
- The 3D simulation rotates only the first planet and the others are fixed. Now, we show only one planet to avoid confusion and speed up the simulation.

SP 3 - **Managing the KISSsys files in the read-only folder**
When the user opens and calculates the files in a read-only folder such as examples or GPK folders, some of the functions may not work correctly.
This happens only when the user executes KISSsys without Windows administrator right.
In order to prevent the error, a new message is added to save the file into a writable folder.
Normally, KISSsys saves now the file into the KISSsoft user folder.

KISSsoft Changelog Version 03/2015 - Service Pack 2

KISSsoft - Bearing calculation

SP 2 - **Friction torque calculation**
We updated the friction torque calculation for bearings according to the main catalogue from SKF 2004 to SKF 2013.
We checked at this point all parameters and formulas, we corrected (changed or added) some new items in the formulas.
NOTE: Some losses will change considerably with this update!

KISSsoft - Gear calculation

SP 2 - **Wrong PPTE documented at results table of Modification Sizing**
At modification sizing dialog, the PPTE was wrongly documented at the results table. All results where still correct calculated and documented in the reports.

SP 2 - **Comments and informations to missing cutters/tools**
In the 2015 gear calculations, the tools are only shown in the graphics, when we calculate a specific hobbing or pinion type cutter, that creates the tooth form. For example, if the tooth form is a mathematical involute, no specific tool was calculated. This can lead to empty graphics in the tool graphic.
To avoid this, an error message is shown instead.
Additionally, a comment is shown when at least one step has no calculated tool.

SP 2 - **Symmetric tooth form**
In the 2D graphics, the approximation method to create the curves of the calculated tooth form didn't create symmetric curves for the left and the right flank.
This was changed, so that in case of symmetric teeth, the curves are symmetric as well.
On unsymmetric teeth, nothing changed.

SP 2 - **Module specific settings in gear calculation**
The user window for the module specific settings in the gear calculation was too high and the OK/Abort buttons were not visible on screens with low resolutions.
The height has been reduced without changing the inputs.

SP 2 - **Worm gear; distances l1 & l11 for safety against bending**
Bending safety Sdel is calcualted based on bearing distance l1, and position l11. Both values were always overwritten.

Important Note: If you stored *.W80 files with Version 2105 (No patch or Patch A) you have to recheck l1 and l11 values, they will be wrong.

SP 2 - **Worm Gear, Report of Sizing of torque improved**
Worm Gear: The Report of Sizing of Torque is improved (Safety for Temperature was not printed).

SP 2 - **Russian comments in gear materials are now translated**
In the materials for the gear calculation according GOST were russian comments, these texts are now translated

SP 2 - **Importing dxf in normal section**
When importing the tooth form of a gear from a dxf-file in the normal section, the transformation was using an approximation. Now the correct transformation is applied

SP 2 - **Modification marker in flank line diagram**
The position of the modification markers in flank diagram were wrongly drawn in US units.
Now it's shown in correct position.

SP 2 - **Wrong unit of tangent and secant stiffness was shown**
The unit of tangent and secant stiffnesses was shown wrongly in the results table of the contact analysis.

SP 2 - **Gear pump: FFT of Oil Inlet graphic**
The FFT of Oil Inlet graphic for gear pumps was not working. This is fixed now.

SP 2 - **Tooth form with root modifications**
When using root modifications that end above the root form circle, the tooth form was not correct and the root diameter was wrong.

SP 2 - **Checking condition for the throat radius of worm wheel**
The checking condition for the maximum throat radius of worm wheel was added.
Now the throat should not exceed the full face width or go deeper than the reference diameter dm.
This will prevent an error in the 3D model generation from a wrong user input.

SP 2 - **Single sided carrier without connector**
FEM calculation of single sided carrier needed alwys the definition of a connector, even if it's not generated. The user can now define single sided carrier without a connector.

SP 2 - **Calculations with dFf, dFa from tooth form**
When calculating the geometry with the option defining the root or tip form circle from the tooth form:
The theoretical form diameters (dFa, dFf) and active diameters (dNa, dNf) are calculated as specified in the standard (not depending on data from tooth form).
These values sometimes were still 'affected' by tooth form data, this is now fixed.

SP 2 - **3D Tooth form of Bevels was not generate in some special cases**
In some cases the check for collision between both bevel gears was too sensitive, therefore unnecessary blocking 3D generation.
This is fixed now.

SP 2 - **Lifetime calculation**
Lifetime calculation is improved for some special cases (where the message 'Iteration did not converge' showed up).
Additionally: In version 2015 the life time calculation is included in the main calculation, we added there now also the message 'Iteration did not converge', if problems were encountered.

SP 2 - **AGMA925 for Planetary Stages**
Planetary stages: The calculation of the angular velocities of sun and ring was changed according to planet speed law:
Sun relative speed = Sun speed - carrier speed
Ring relative speed = Planet relative speed * (dw_Planet / dw_Ring)

This can change considerably some main results.

SP 2 - **License file invalid**
The access directory of floating licenses was in some cases not read correctly from the license file.

KISSsoft - Graphics

SP 2 - **Joining flanks in racks**
When trying to join the flanks in the meshing graphic, it was not correctly done in the rack calculation.
The issue has been fixed.

KISSsoft - Shaft calculation

SP 2 - **The friction torque method wasn't correctly set**
The list for the calculation methods of the bearing friction torque wasn't correctly set (in the user interface).

SP 2 - **Shaft calculation with duty cycles: Order of bins in load cycles**
The result was wrong, if the order of the bins from a load cycle isn't from the highest torque to the smallest one.
Now, the order of the bins must not necessarily be from the highest to the smallest torque.

SP 2 - **Center of mass for conical elements was wrong**
The calculcation of the center of mass for conical elements (both inner and outer contour) was wrong. This affected only the documentation of the shaft's center of mass, not the calculation results.

KISSsys - General

SP 2 - **KISSsys 3D viewer error for shaft with inner geometry**
KISSsys 3D viewer did not show the shaft inner geometry correctly.
In addition, sometimes the viewer shows a message concerning "...revolving error.." and the shaft is not shown.
Now the problem is fixed and the shaft geometry is shown correctly.

SP 2 - **KISSsys could not get contact analysis results**
The contact analysis results from KISSsoft calculation are initialized after the calculation, and KISSsys could not get any result.

SP 2 - **Mapping of bearing forces to FEM nodal displacements.**
In some KISSsys models with housing stiffness integration, the mapping of bearing forces to FEM nodes and of FEM nodal displacements to bearings was not performed correctly.

SP 2 - **List TypeOfLub for cylindrical gears**
The list "TypeOfLub" for all cylindrical gear calculations had the last two options contained in one option. They are now separated in two.

KISSsoft Changelog Version 03/2015 - Service Pack 1

KISSsoft - CAD interface

SP 1 - **Solid Edge: New Simplified view**

Now a cylindrical gear can be created in two different models.
With the new simplified model it is easier to cut the gear in the drawing, so that the important diameters can be seen.

SP 1 - **Interface to Autodesk Inventor 2016**
Interface to Autodesk Inventor 2016 is implemented.

KISSsoft - Gear calculation

SP 1 - **Added user input of Young's modulus and Poisson's ratio in the FEM calculation of the planet carrier.**
Two new entries are now available in the definition of the parametric planet carrier for FEM calculation. They can be used to define the Young's modulus and the Poisson's ratio of the planet carrier material.

SP 1 - **Plastic gears without load**
An internal message "Error Woehler" was produced, when calculating plastic gears without any load. The message is not shown anymore.

SP 1 - **Graphic of bearing forces in the contact analysis**
The bearing force as calculated for the graphic in the contact analysis was considering only the bearing distance set at dialog "Define face load factor". The distance s was not considered. This is now fixed. The calculation is always considering the distance s positive according to ISO 6336 Picture 13a.

KISSsoft - General

SP 1 - **Patch A (Service pack 1) for Version 2015 : Important general note**
Due to the implementation of a new dynamic user interface capabiulity in release 2015 of KISSsoft, after we produced the CD, some errors were found and corrected.
Therefore it is requested to add PATCH A (Service pack 1) after the the installation of the new version from CD.

We therefore do not document here any fixed problems which were new in the CD Version 2015 (but did not appear in Version 2014G).