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Limiting a23 values from KISSsys

1 Introduction

1.1 What is a23 value

“a23” value for the bearings calculation is an extended lifetime calculation coefficient which is used to take in the account of lubrication effect. This value is used when calculation is based on FAG 1999 or ISO 281-1 extended calculation methods. Lifetime with basic method is multiplied with this value to get a extended lifetime for the bearings.

1.2 Calculated value

Value is calculated based on the formulas in the standard. In some cases this value can be very high giving uncertain results to the real situation. Therefore this instruction is written to be able to control this value manually or to limit the maximum value to a certain value. This value is different for each bearing and it depends on loads, oil, temperature and cleanness. It is not possible to limit this value inside KISSsoft module at the moment, but we are able to transfer it to the KISSsys and do the limitation in there.

2 Limiting the value

2.1 Adding new variables

The a23 coefficients for the bearing calculations are transferred to the KISSsys and new variables for those coefficients are defined (a23_1 for the first bearing and a23_2 for the second bearing.) in the example limiting values for two bearing calculation is described.

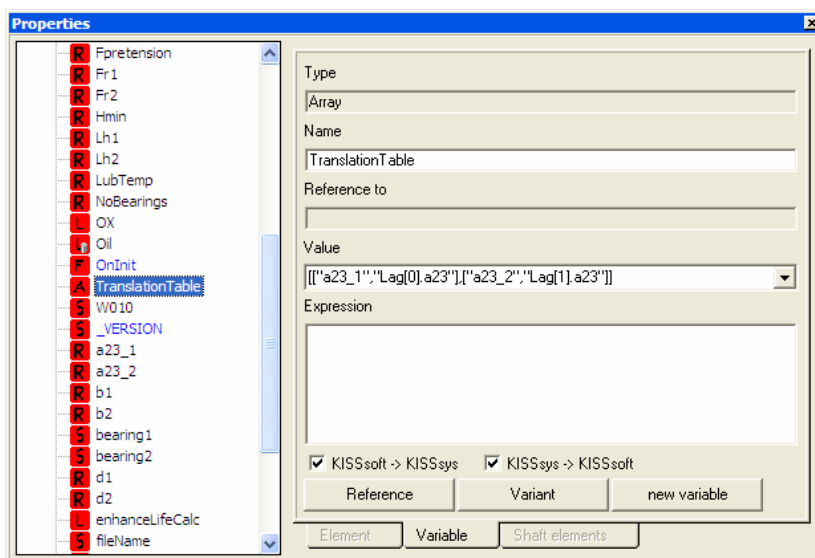


Figure 2.1-1 Translation Table for the a23 coefficients

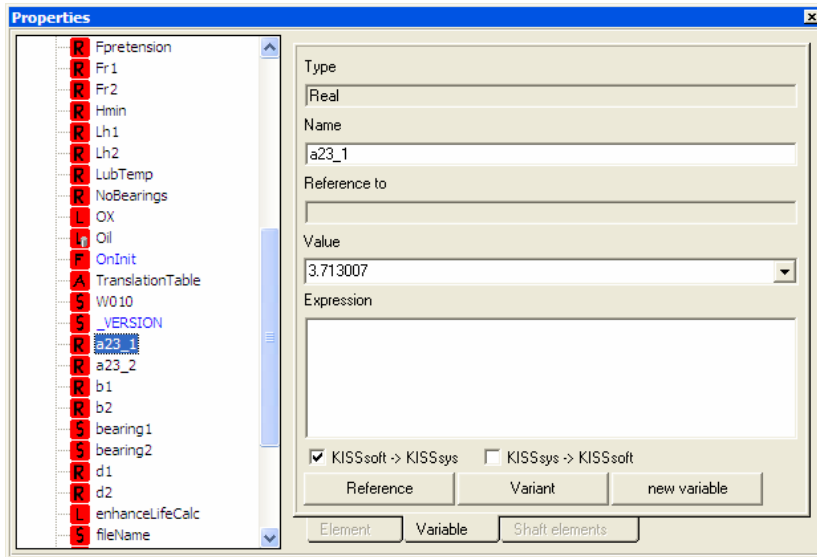


Figure 2.1-2 New variables for the coefficients

Variables to be transferred are described in the table.

New variable	KISSsoft name
a23_1	Lag[0].a23
a23_2	Lag[1].a23

See more information of the “TranslationTable” usage from instructions “ins-007-02-TranslationTable.pdf”

2.2 Limiting the calculated value

Then new function is created to check those coefficients after calculation to see if they meet the requirements. If values are bigger to maximal value a23 coefficient is limited to maximum value and new lifetime calculation is performed again. This is done for the all bearing modules.

Function code: “BearingCalcs”

<pre> VAR a23, bcalcs,b; a23 = []; bcalcs = _O.OBJ_GetChildren(1,"kSoftBearing"); // collect list of bearing calculations IF UserInterface.enhanceLifeCalc != 0 THEN // If enhanceLifetime calculation activated check for the a23 FORALL bcalcs b DO IF b.a23_1 > 3 OR b.a23_2 > 3 THEN // if a23 for bearing 1 or 2 is more than 3 limit it. IF b.a23_1 > 3 THEN a23[0] = 3; ELSE a23[0] = b.a23_1; ENDIF IF b.a23_2 > 3 THEN a23[1] = 3; ELSE a23[1] = b.a23_2; ENDIF b.OBJ_SetMemberExpr("enhanceLifeCalc",0); b.Calculate(); b.Lh1 = b.Lh1*a23[0]; b.Lh2 = b.Lh2*a23[1]; b.OBJ_SetMemberExpr("enhanceLifeCalc","UserInterface.enhanceLifeCalc"); b.a23_1 = a23[0]; b.a23_2 = a23[1]; ENDIF NEXT ENDIF </pre>	<p>Defining local variables.</p> <p>a23 value is initialized to be array. List of all bearing calculations is created</p> <p>Checking if enhancedLifeCalculation is activated (FAG 1999 or ISO 281-1) If yes check if calculated a23 values are below the maximum value. If another one is greater than limit value (in this case 3)</p> <p>Check if a23 for the first bearing is too high and set is to the max value or use calculated value is it is ok</p> <p>Check if a23 for the second bearing is too high and set is to the max value or use calculated value is it is ok</p> <p>If values are limited perform the lifetime calculation again with basic method Multiply the results with a23 values to consider lubrication</p> <p>Set back the original calculation method</p> <p>Set a23 values in the calculations according to the calculation values</p>
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This function is to be performed after normal calculation. If “basic rating” or normal Lh10 bearing lifetime calculation is used then a23 is set to 1.

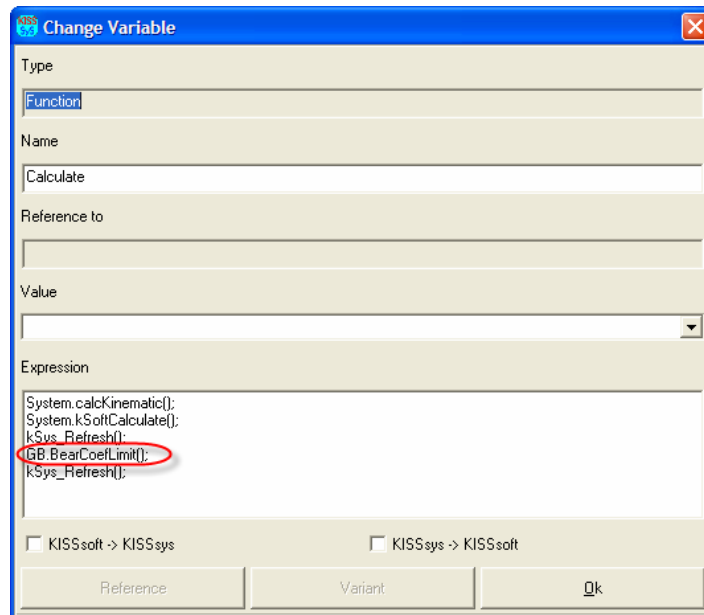


Figure 2.2-1 a23 limitation calculation is performed after normal calculation

Note! Values may now differ from the bearing calculation report, because a23 maybe limited manually, but if single bearing module calculation is performed again calculation is made with calculated (“real”) a23 value instead of limited values.