

MEMO EV/M18.021
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Subject Release-notes for CONTACT version 18.1.5

Summary

These release-notes document the changes in CONTACT version 18.1.5 with respect to version 18.1. This is a minor update, providing improvements in the CONTACT library, mainly related to wheel/rail contact module 1.

1 Extensions added to the CONTACT library

The CONTACT library has been extended in order to facilitate the integration into vehicle system dynamics simulations.

- An option is added to provide wheel and rail profiles as lists of values (arrays) instead of using file-names (subroutines `cntc_setrailprofilevalues` and `cntc_setwheelprofilevalues`). This is particularly convenient for the computation of wear, where profiles change during the course of a simulation.
- The description of rail irregularities now consists of position and velocity variables. This is relevant for flexible track modelling, where rail velocities may be significant compared to the wheel motion.
- A facility is added for wheelset flexibility, that allows for motion of the wheel profile relative to the wheelset center of mass: E₁-digit 5–8 and subroutine `cntc_setwheelsetflexibility`.
- New subroutines are added to get the wheelset position and velocity parameters after the calculation, `cntc_getwheelsetposition`, `cntc_getwheelsetvelocity`, and to get the parameters related to the contact grid: `cntc_getpotcontact`.
- Examples are added that illustrate the use of the CONTACT library for wheel/rail contact processing (module 1) from Matlab (`matlab_mbench.m`) and Fortran (`test_mbench.f90`).

2 Resolved problems

- The calculation of the creepages in module 1 is improved, accounting for additional nonlinear terms that are relevant in cases with high yaw and/or contact angles.
- The support for Miniprof `ban`- and `whl`-files is improved, especially with respect to the removal of points where profiles fold back and become multi-valued.

3 Compatibility w.r.t. previous versions

The specification of rail irregularities is changed. User input files should be modified as follows:

- Velocities `VY`, `VZ` and `VROLL` should be added on the same line as position deviations `DY`, `DZ` and `DROLL`.

Changes to the CONTACT library are as follows:

- Subroutines `cntc_setrailprofile` and `cntc_setwheelprofile` are renamed to `cntc_setrailprofilefname` and `cntc_setwheelprofilefname`.
- The required number of inputs is changed in `cntc_settrackdimensions`: 9 when $Z_1 = 3$ and 15 when $Z_1 = 4$.
- Subroutines `cntc_getnumelements` and `cntc_getgriddiscretization` are replaced by `cntc_getpotcontact`.

4 Known problems and restrictions

One feature that is not treated well is the rolling direction parameter `CHI`. It is generally advised to use `CHI = 0` or `180°` or restrict `CHI` to at most a few degrees.

The results may contain a significant discretisation error when a small number of elements (7×7 , 15×15) is used. Particularly the frictional work appears to be susceptible to this.

Premium version & CONTACT library

The basic version of CONTACT is freely available in binary form, and can be downloaded from www.kalkersoftware.org. “Module 1” for wheel/rail contact geometry processing is provided commercially through a [premium version](#) and through the [CONTACT library for MATLAB, Fortran and C](#). This functionality is marked [blue](#) in the release notes and in the User Guide. For information on licenses you may contact us at support@kalkersoftware.org.