FEV VIRTUALENGINE

Release Notes

25.2

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Dear reader,
if you are reading these Release Notes as hardcopy (PDF document), please be aware that actually the same document is also part of the FEV Virtual Engine online documentation ("help"):
In the online version the Release Notes contain hyperlinks to the relevant help topics - which is usually very helpful to locate and learn about new functionality.

These are the release notes for FEV Virtual Engine 25.2. This release supports the Adams 2017.2.0 release.

Unless otherwise indicated, all statements made within this document regarding product changes refer to the previous release FEV Virtual Engine 25.0, 25.1.

The following icons imply:

 FEV Virtual Engine versions running on Windows® operating systems

 FEV Virtual Engine versions running on Linux® based operating systems

If no icon is depicted the text refers to both versions.

This document is grouped into the following sections:

Supported Operating Systems

Following operating systems are currently supported:

Windows® 7 (x64), 10 (x64)

Red Hat® Enterprise Linux® (RHEL) 6.7 (x64), 7.1 (x64)
SUSE® Linux® Enterprise Server (SLES) 11 SP3 (x64)

Following Adams® versions are currently supported:

MSC Software

Adams® 2017.2.0

You can work with either a version of FEV Virtual Engine which installs on top of a supported Adams® base installation (the FEV Virtual Engine for Adams variant), or use the stand alone version of FEV Virtual Engine which incorporates an installation of the Adams Framework as well (the FEV Virtual Engine variant).

Your operating system must be set up / configured properly and working. This also applies to your access to your local network (LAN) when using a floating license.

Licensing and Hardware Requirements

Licensing Requirements

The release FEV Virtual Engine 25.2 requires FEV Licensing 4.21.

Hardware Requirements

The requirements regarding hardware basically are those of Adams®, on top of which FEV Virtual Engine is running as vertical application:

- up-to-date CPU, multi-core CPUs are recommended
- at least 2 GB of memory (RAM), recommended: 4 GB or more
- a graphics adapter which supports OpenGL 1.2 or later (see below for recommended models and drivers)
- enough free space on your harddisk: at least 8 GB for installation and operation
- network adapter, when using a floating license

Graphics adapter cards and drivers

The recommended graphics adapter cards and drivers are these:

NVIDIA Quadro FX 580: NVIDIA Version 340.66 (avoid 310.19)

RHEL: NVIDIA Quadro FX 580: NVIDIA Version 331.67
SLES: NVIDIA Quadro FX 580: NVIDIA Version 331.79

Display(s)

One or (recommended:) two larger displays ≥ 19" are usually helpful when working with FEV Virtual Engine. The displays must have a resolution of at least 900 px in height.

Functional Changes and Enhancements

Improvements 25.2

Gear simulation

The available gear type named 'ac_gear' is enhanced to include details of the **tooth flank micro geometry** according to ISO-Standard. In order to run simulations with such detailed gear models, the new implemented solid to solid contact can be used, which is coops with the full 3D tooth geometry and also incorporates possible tilting of the gears.

A new **flexible gear** type named 'ac_gear_flx' is available. This gear type allows the simulation of gear dynamics were the tooth and base stiffness (flexibility) of a gear is of importance. The new flexible gear type is based on a MNF that must be adequately meshed such that the essential details of a gear pair contact are included. The flexible gear in its nature supports a full 3D tooth geometry and also considers possible tilting of the gears and deflection of teeth.

A new UDE named "ac_gear_transm_error" is available, which adds a request to a gear force element for the calculation of the dynamic transmission error of the gear pair. This is of particular use when working with flexible gears.

Shaft UDE

A new UDE is available that allows the detailed modeling of shafts. Shafts are circular symmetrical parts that can be build up of several shaft sections which can have linear varying radii over their shaft length.

Single Valvetrain Kinematics

The Single Valvetrain Kinematics analysis has been extended to include push-rod valvetrains as well. This mean that the analytical kinematics approach now supports the following valvetrain types:

- Tappet
- Finger Follower
- Rocker Arm
- Push-Rod (new)

The tight integration with the Valve Lift Designer allows to create cam contours directly reflecting any change on the valve lift, including an assessment of critical parameters such as contact stress. The kinematic models with 0 degree of freedom can be turned into dynamic models compliant for analysis in time domain through a simple toggle switch.

FEV Virtual Engine Help

The help / end-user documentation has been updated where appropriate to reflect the latest changes in functionality (please see the above list of functional changes and enhancements) and also to resolve knows issues with the help.

Note: Whenever you feel that a link is missing, you notice a "lost topic" or stumble upon unclear (or faulty or incomplete) descriptions - let us know. Please provide a reference to the relevant help page and send an email to: virtualengine@fev.com
We welcome your feedback and any hint regarding the improvement of the FEV Virtual Engine help.

Corrections

Fixes and minor enhancements in 25.2

[CR1849] The modeling of the Piston and Piston SG (simple geometry) has been reworked, in that now a less strict set of piston geometry parameters can be handled.

[CR1964] Added missing side forces request in generic spring.

[CR1949] Added Temperature Output to EHD bearing results.

[CR2038] A method for checking the replaceability of flexible elements prior to running the converter was implemented.

[CR2052] Crank Concept Analysis:The output file stress_pin had a wrong scaled channel named 'Amplitude'.

[CR2053] Fixed the issue that occasionally an error occurs during setting up an external geometry crankshaft when using a geometry file that had been partitioned by an external CAD Program.

[CR2069] For 2D-Simulations sprockets, pulleys, and guides are set to be planar parts. Additionally these parts are constrained to other parts using fixed or revolute joints. This causes warnings during a simulation run. This was fixed as in the chain links wrap macro a new check for the existence of a fix or revolute joints is invoked setting the part then to be non planar.

[CR2083] The failure to replace a two cylinder crankshaft to a flexible crankshaft was fixed.

[CR2084] The generation of an assembly from a subsystem that contains a flexible body with different location than default could result in a system crash. This has been resolved.

[CR2086] If a template contains a flexible block an error occurred during converting from older models. This was fixed.

[CR2087] Old templates containing gear_3d elements caused an error during conversion. This was fixed.

[CR2095] The single mass flywheel read macro read the wrong 'CM Location Relative to Part' variable from

the property file.

[CR2096] Fixed the issue, that sometimes, the orientation of converted gears from older versions was wrong.

[CR2104] If two generic analysis results with the same short name existed in the session under different models, an error could show up during starting a new generic analysis with the same short name as the loaded analysis results. This has been fixed.

[CR2106] Now the option to deactivate the primitive joint in plane (ic_joint) of all gear forces is available, as the lack of this capability caused a problem if more than one gear force was applied on the same gear.

[CR2108] If instances in an old model were in a deactivated state, the automatic conversion to a higher version would activate them without checking and setting the requested active state. This issue was fixed.

[CR2111] Fixed the issue, that sometimes, upon publishing a model that contains a geometry that was imported from a shell file, an error message showed up reporting the absence of the geometry shell file.

[CR2113] Fixed the issue, that the gear-3d instance occasionally had a wrong orientation after it was replaced from a gear instance.

[CR2124] Fixed the failing unit sensitivity of the modal force (MFO) bearing and the flexible bearing regarding the bearing parts position of the shell and/or pin.

Known Issues

Full vehicle analysis, ACAR solver

For a vehicle analysis the Adams/Car solver must be used. To this end make sure you first start Adams/Car or Adams /Driveline, then load FEV Virtual Engine as plug-in.

Maximum name length of MTX files, EHD bearings

The automatically created (and named) MTX files may have file names consisting of more than 70 characters including the .mtx suffix (i.e. 66 characters for the file base name).

The automatic naming of MTX files is as follows:

subsystem-name_instance-name.mtx

If a new MTX file is created it will be created with the same name (i.e. an existing MTX file will be overwritten). But if the 70 characters limit is exceeded Adams automatically switches to a new naming scheme. In this scheme MTX files are named flex_n.mtx where n is a counter which is incremented for any new created MTX file.

This sort of naming will lead to significantly longer calculation time when using EHD bearings, in that case please check the MTX file naming. To avoid this problem you must make sure that the MTX file base name does not exceed 66 characters - adjust the subsystem-name and the instance-name.

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Contact and Support for FEV Virtual Engine

Product related questions

General information about FEV Virtual Engine can be found on FEV's global web site: Virtual Engine

To contact us regarding product related questions please email to: virtualengine@fev.com.

For support inquiries please see below.

Support

The FEV Virtual Engine support is provided through FEV and its partners. Your local reseller can supply you with all necessary local customer support contact information.

FEV Virtual Engine customers having a valid Maintenance Agreement may direct their support inquiries via email to:

virtualengine@fev.com

In order to download FEV Virtual Engine you need to register. After a successful registration you are granted access to the download site, and you will obtain the agreed upon FEV Virtual Engine license keys. The installation files needed for ***FEV Virtual Engine*** and the corresponding license management ***FEV Licensing*** are available from the FEV download site or from the VI-GRADE reseller site. Here current versions, updates and patches can be obtained.

To use the FEV site click here: FEV download site

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Chinese Customers

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Please use the following email address for local support: