QForm UK 10.2.0, March 25, 2022

What's new | Added features

Significant

- Object positioning:
  - **Interactive control** for object movement and rotation
  - Move objects in local or global coordinate systems
  - Bind the positioning control to the nodes of the finite element mesh
  - Move and rotate the object relative to their own axes
  - Simplified and **advanced** object **positioning modes**
  - Positioning mode could be activated either on the toolbar, or in the drop-down menu when right-clicking on an object in the results overview window, or by pressing the Ctrl + Space key combination
- Sectional view:
  - Definition of section planes directly in the results overview window
  - Control the orientation and position of the section planes with the interactive positioning control
  - Manage the properties of sections in the object tree
  - Two modes of sectional view: **Section** and **Slice**
  - Visual trimming of traced objects when sectional view is activated
  - Adaptive initial position of the newly created section plane
  - Creating multiple section planes and an **array of section planes**
  - Copying of section planes
  - Saving the created section planes and their positioning history in the project file

Solver

- Possibility to use two forging manipulators at the same time in multi-blow processes
- Possibility to rotate the workpiece together with the selected tool around the axis of that tool in a multi-blow process

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- Automatic gravitational positioning of the workpiece before operation
- Possibility of creating parametric geometry with a tetrahedral mesh that retains the hexahedral mesh
- Hexahedral finite element mesh clipping using parametric geometry created in QForm
- Option to simulate **diffusion processes** between the workpiece and the environment:
  - Setting the dependence of the diffusion coefficient on temperature and concentration of a chemical element by a piecewise linear function or formula
  - Calculation of the diffusion coefficient for the process of carburization and decarburization of steel based on the chemical composition of the workpiece material
- Boundary condition for simulation of **induction heating** of a workpiece
- Standard subroutine **Flow lines outcrop** for estimating the angle between flow lines and surface of a forged part or a final part after machining
- Additional model of the coupled mechanical problem, which calculates the stress-strain fields of the tool at each step, but the tool remains rigid
- Option to change the way contact loads are transferred from the workpiece to the tool. Available for the separate coupled mechanical problem or when calculating the tool in the postprocessor. Transfer through contact pressures can be changed to transfer through nodal forces
- Automatic creation of a text file with st (**stack trace**) extension when the simulation is stopped unexpectedly (takes no more than 1 kilobyte). With the help of such a file the technical support can determine the location of an error in the program
- Option not to store all calculation records in the operation **Cyclic tool heating**
- **Trace contours** loaded from a dxf file in 2D tasks
- Option to automatically calculate the axis of rotation for any three-dimensional object
- Option to automatically determine the position of the symmetry planes

Interface

- Loading the initial coordinates of traced points from Excel file
- Option to keep settings in **Operation tab** as defaults
- Saving animation for the selected range of operations or blows
- Option to approximate the experimental values of the workpiece material flow stresses by the Henzel-Spittel function
- Option to plot the active field values **distribution along a specified line**: along a straight line, along a curve on the surface of the object, or along a curve on an edge of the object
- Graph of the rotational speed of the tool
- Option to **smooth out the graphs**
- Option to close certain windows in multi-window mode
- Translation of QForm interface into French
- Checking the availability of the new version of the program

Enhancements

Solver

- Algorithm for solving the contact task is reworked. The calculation speed is increased
- Algorithm of the remeshing is improved
- Capabilities of longitudinal rolling modules are expanded:
  - Option of cross transfer and rotating of the workpiece between passes in the reverse rolling module
  - Algorithm of workpiece positioning on the process initial stage is improved
- Algorithm of tool movement when the drive is set to a time-dependent tool stroke is improved
- Algorithm of cyclic tool heating is improved
- Algorithm for accounting for boundary conditions given by imported geometry is improved. Simulation time in such cases has decreased significantly
- List of API functions is extended

- Asynchronous starting of the simulation and control of the current simulation status using API are realized
- Lines and points tracing algorithms have been optimized. Increased tracing speed

Interface

- Preferences for transparency and shading of objects have been changed
- Capabilities of the object tree are expanded:
  - Traced objects are shown
  - Access right-click menu options
  - Work with boundary conditions areas is improved
- Option to open a qform file by dragging it to the QForm window is added

Resolved issues

- Fixed the incorrect work of the forging manipulator and no return to the initial position
- Fixed a malfunction with spring-loaded tool and spring between tools
- Fixed a thermal problem issue that appeared on some processors when the temperature in some nodes dropped to zero degrees
- Fixed clipping surface operation when limiting the number of compute cores
- Fixed problem with missing tool movement in cyclic tool heating operation
- Fixed the problem of not disabling the **Spreyer** boundary condition at a defined time
- Fixed a bug in displaying folds on the symmetry plane in some cases
- Fixed numbering of adaptation boxes in the objects tree
- Fixed the incorrect work of the stopping condition of **Axis 1 - Tool Rotation** in longitudinal rolling operation
- Fixed an error in solving a thermal problem in simulation of reverse rolling operation

*Additions and changes in **QForm Extrusion** module are presented in a separate release notes file**