MADYN 2000 Release 3.0

1. The Main New Features

In release 3.0 the interfaces to access the internal data are reorganised. This will allow taking full advantage of the proven object oriented data structure of MADYN 2000 and will facilitate the implementation of further new features in the future.

Major new features enhancing the user friendliness implemented in release 3.0 are a System Explorer and the intelligent behaviour in case of system changes. Additionally all Graphical User Interfaces (GUIs) have been improved.

1.1 The System Explorer

The newly implemented System Explorer in release 3.0 allows controlling every step of a rotor dynamic analysis, the modelling, the definition of loads and analysis parameter, the starting of an analysis and the viewing the results.

The previous controls from the main MADYN 2000 window still exist, but it is probably more convenient to use the system explorer controls.

The system explorer together with the system GUI is shown in fig.1 as it is opened when creating a new system. The system GUI then allows adding shafts with their section in a similar way as in previous releases.

The system explorer of a system with several shafts, couplings and a gear is shown in fig. 2 with the buttons to plot and print model data.

The system explorer with the GUIs to define loads, analysis parameter and to view results is shown in fig. 3.

Analysis parameter such as speeds or loads of fluid film bearings are maintained after an analysis and can be invoked by the respective GUI. To repeat an analysis with a change of only some of several parameters it can be cloned, the concerned parameter can be adapted and the analysis restarted. In previous versions all parameters had to be retyped. The results of a new analysis will be added to those of existing analyses.

1.2 Intelligent System Behaviour

The behaviour in case of system changes will be managed in an intelligent way, i.e. parts of a system, which are not affected by a change, will be maintained. For example if a diameter of a shaft section is changed all results in the system will be deleted, however, all loads and analysis parameter will be maintained; if properties of fluid film bearings are changed, then results of a critical speed map will be maintained, since the bearing is replaced by a spring for this analysis, whereas eigenvalue results calculated with the fluid bearing properties will be deleted. In case of changes influencing the topology such as the deletion of sections, loads are also maintained. Of course it should then be checked if they are still adequate. In case of simple modifications such as the change of denotations of stations or shafts everything in the system is maintained.

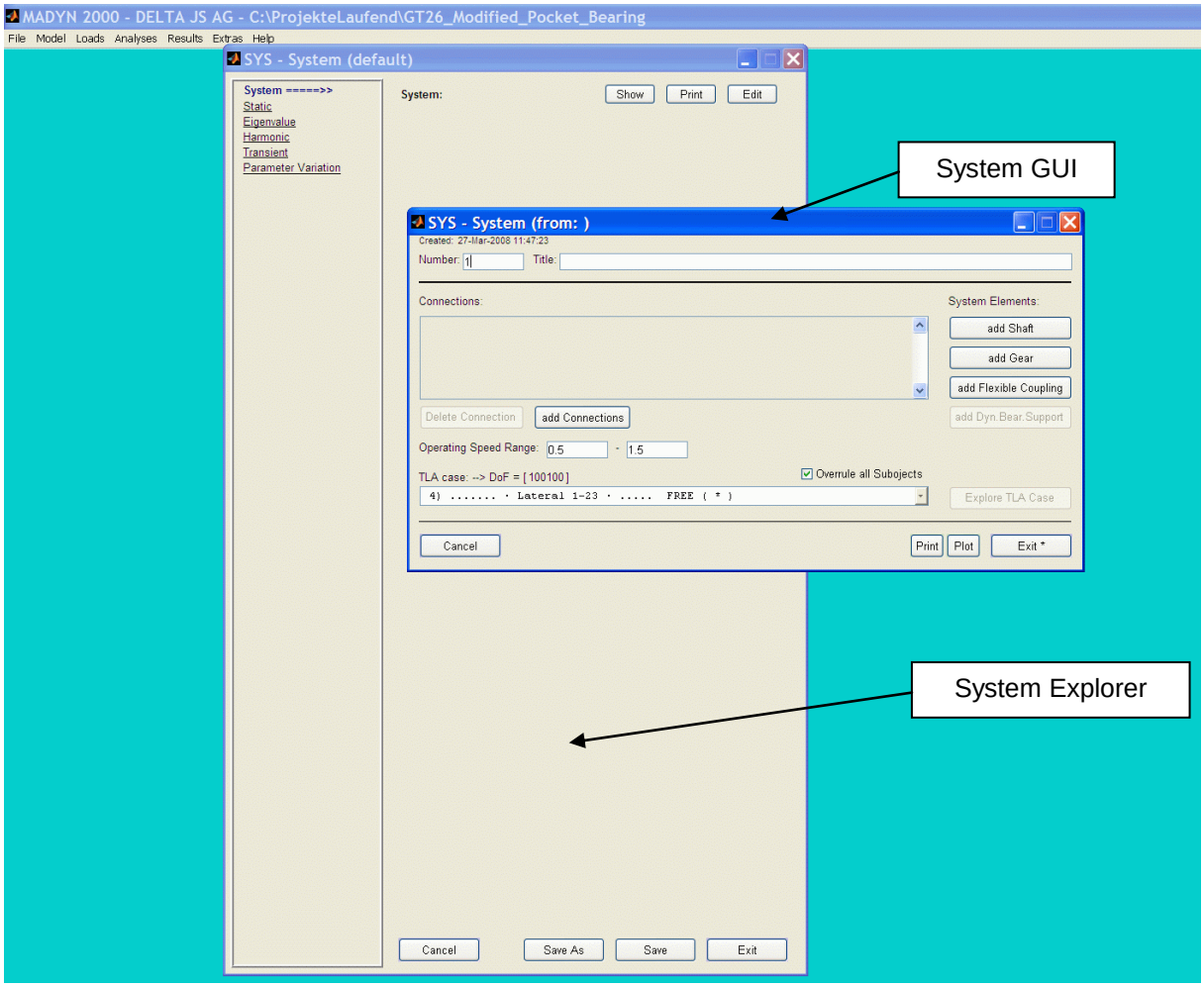


Figure 1: System Explorer with System GUI

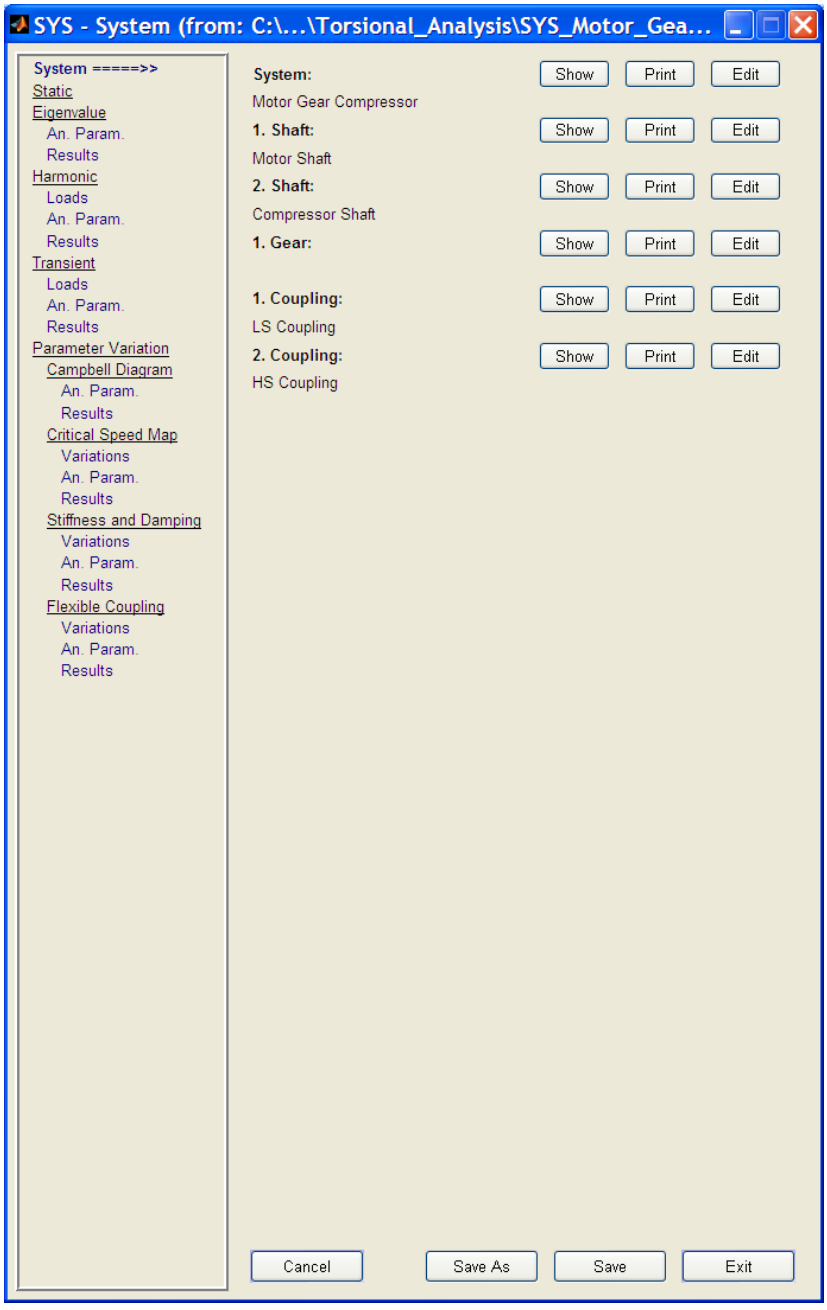
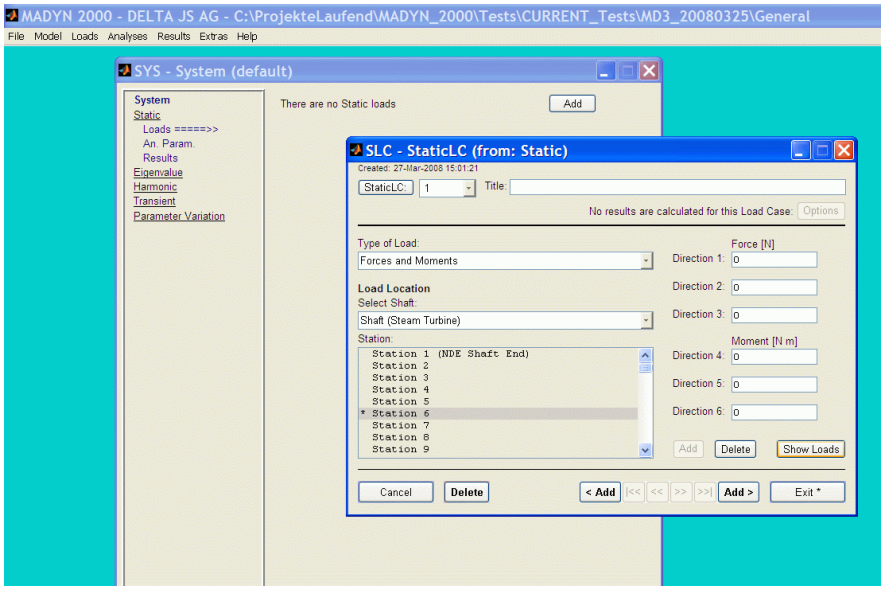
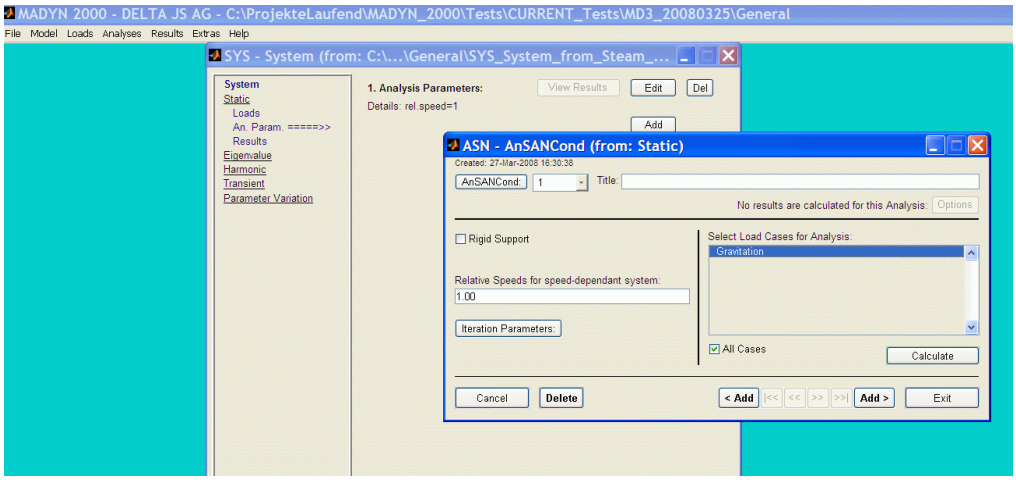


Figure 2: System Explorer for a system with two shafts, a gear and two couplings





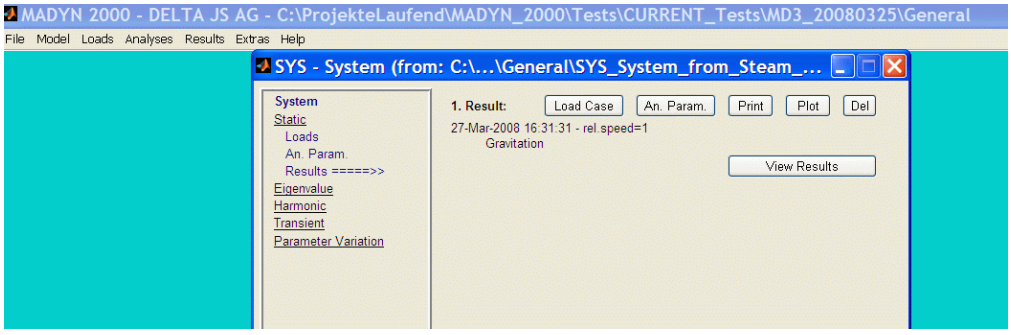


Figure 3: System Explorer with controls to define loads, analysis parameter and view results

2. What else is different in Release 3.0?

The reorganisation of the interface to access the internal data as well as the improvement of the data structure itself has some consequences for the user as described below.

2.1 File Names

In order to be able to differentiate between files with the new and old data structure, the extension of the files in release 3.0 is no longer MD2 but MD3. Of course all MD2 files can be imported.

2.2 GUI Behaviour of Objects

In previous releases the GUIs of model objects and any of their sub-objects (e.g. a shaft and section GUI) could not be open at the same time. For example if the section GUI was opened by the respective button in the shaft GUI, the shaft GUI was closed.

In the new release mother GUI and sub-object GUI can be opened at the same time. Also any model GUI and analysis or load GUI can be opened at the same time. In the latter case either of the model or analysis / load GUI are in read only mode to avoid conflicts. The read only mode is clearly marked in the GUI. To switch to normal mode the GUI, which could cause a conflict, has to be closed.

2.3 Loads and Analyses

In previous releases loads could be added to shafts and gears and analyses could also be started with these objects. A system was then automatically created.

In the new release loads and analyses can only be defined for systems, i.e. to carry out an analysis for a single shaft or single gear they have to be added to a system beforehand.

The procedure in the new release is clearer. In the previous release the systems created from shafts or gears by adding loads or carrying out an analysis were kind of incomplete, because they did not have any connection, which was necessary to create a system by modelling.

2.4 The Connection GUI

Couplings are treated differently now in the connection GUI, they serve as a connecting element, i.e. to connect two shafts via a coupling, the shafts with their stations have to be selected together with the coupling as shown in fig. 4.

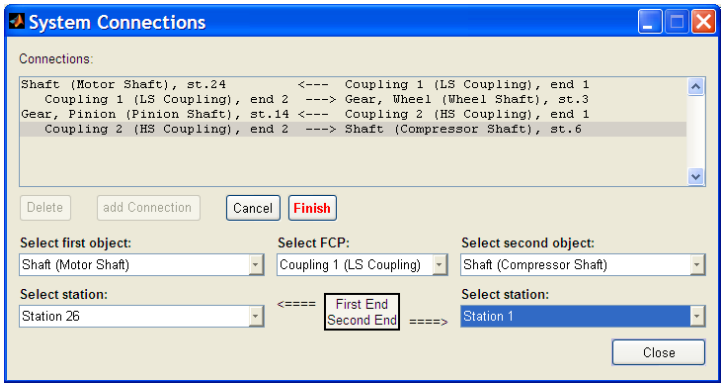


Figure 4: Connecting two shafts via a coupling

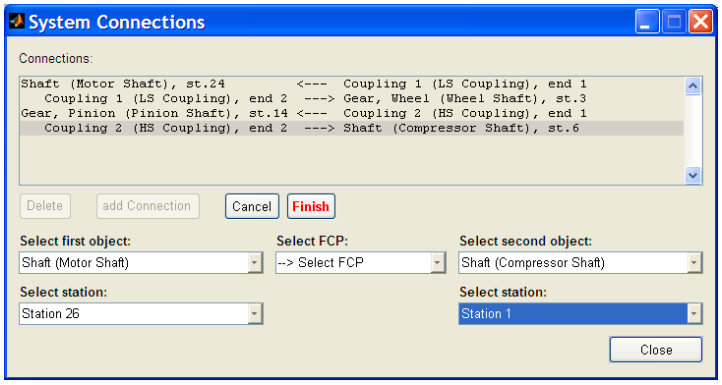


Figure 5: Direct connection of two shafts

2.4 The Pinion GUI

The new object of the pinion has been created. It consists of a shaft with some additional information such as tooth stiffness and mesh radius. In the previous version this information was part of the gear object.

The new pinion and gear GUI are shown in fig.6.

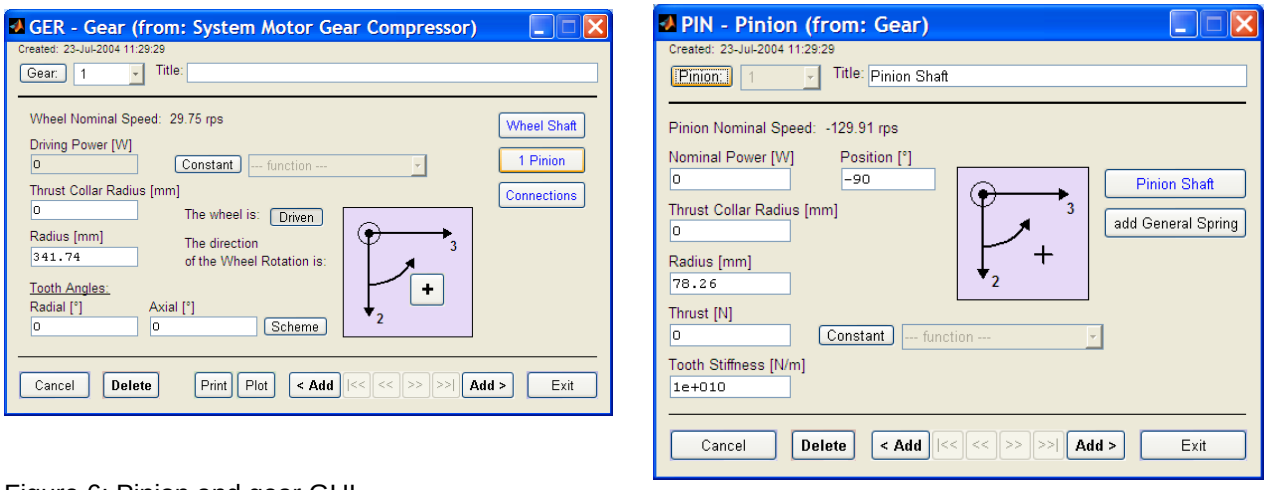


Figure 6: Pinion and gear GUI

2.5 Transient Excitation Functions

In the new version 3.0 the transient excitation functions are stored as part of the load. This allows defining the excitation function for standard loads. As a consequence the excitation functions are defined within the load GUI. In previous versions the excitation functions were defined separately from the load and stored in the system not as part of the load.

2.6 Import of External Data

Imported external data such as for example dimensioned fluid film bearing coefficients in the new version are now all stored in the system together with the file name of their origin as a reference. In the previous versions this was not the case (with some exceptions such as DBS), only the file name was stored. The advantage of the new version is that the system is still complete, even if the file of the imported data has been deleted or shifted to another directory.