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BMW MOTORRAD: Transient Animation of Flexible Bodies with Modal Coordinates from Multibody Simulation

Challenge

- The influence of structural deformations on the vehicle dynamics is a very important field during the development phase.
- In a full vehicle multibody simulation (MBS) model all relevant structural parts are considered as flexible bodies.
- A detailed visualization and an efficient investigation of the structure's transient behavior is required, but is not facilitated by current MBS post-processors.

Approach

- An additional, detailed modal base, which includes also stress results, is calculated during the creation of each Flex Body.
- The modal coordinates of the Flex Bodies obtained from the MBS result along with the respective additional modal base are input into META.
- The "Transient Analysis of Flex Bodies from MBS" toolbar is used for the investigation of the full elastic behavior, through transient animation of deformations and stresses, as well as contribution plots for modal results.

Results - Benefits

- Detailed study of the transient behavior of a component during maneuvers, by using the original FE-model with all its degrees of freedom, instead of using a flexible body with only a few display nodes.
- Identification of problem areas and resultoriented optimization based on relevant transient full vehicle maneuvers.



"By reading the modal coordinates of flexible bodies from a multibody simulation and using the new Toolbar in META, it was possible to investigate the structural behavior of components during specific maneuvers in very high detail.

This helped us to optimize components based on transient maneuvers and to reach an optimal design regarding vehicle dynamic behavior."

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