Multibody Model of a Motorbike with a Flexible Swingarm

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Considering the specific case of the multibody modelling of a racing motorbike, where the rigid model of the rear swingarm has been replaced with a flexible one, a general approach to flexible multibody systems modelling in Modelica is presented in this paper. In particular, the steps required to generate the model of a flexible body starting from a FEM analysis, performed with commercial packages, are detailed. Simulations results are shown with reference to a sudden braking and to a series of impacts with curbs. In this last case, an unstable behaviour occurred when considering the flexible component, which is currently under investigation.
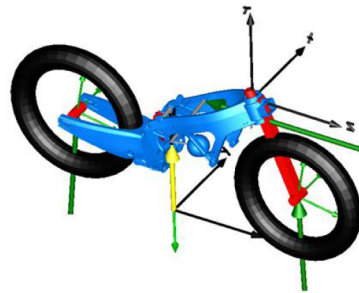
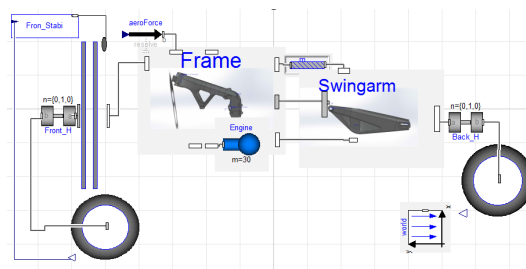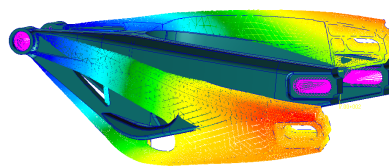Figure 1: Model of the motorbike.

Figure 2: Scheme of the Modelica model of the motorbike.

Figure 3: First torsional eigenmode.