Chair of Applied Mechanics
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Model Reduction Techniques for a Novel Flexible Multibody Dynamics Formulation

Semester Thesis/Master's Thesis

Flexible multibody dynamics refers to the computational strategies used to determine time histories of motion & deformation of interconnected components subjected to large overall motion. Examples are robots, vehicles, mechanisms, machines, etc. Recently, a novel formulation has been proposed – the formulation may be seen as an improved absolute coordinate formulation (ACF) with a similar equation structure, i.e.,

$$\widehat{\boldsymbol{M}}\ddot{\boldsymbol{q}}(t)+\widehat{\boldsymbol{K}}(\boldsymbol{q}(t))\boldsymbol{q}(t)+\widehat{\boldsymbol{J}}^{\mathrm{T}}(\boldsymbol{q}(t),t)\boldsymbol{\lambda}(t)=\widehat{\boldsymbol{Q}}(t).$$

Choosing absolute coordinates as degrees of freedom simplifies the equations of motion but complicates model reduction procedures. This thesis should investigate the potential of the new formulation with different reduction techniques, such as the method of snapshots.

Topics Multibody Dynamics, Finite Element Method, Model Reduction, Python

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