MODELLING OF COMPLEX DYNAMICS

Assignment

Develop a framework for performing explicit time-based analysis in NX Nastran to determine the advantages and disadvantages of explicit time analysis has for different types of complex dynamical problems w.r.t. linear solutions.

Activities

- Simulate the time response of a flexible multi-body system in NX Nastran using the explicit solver.
- Validate the results by comparison to LTI time simulations in Matlab and lumped mass approaches.
- Identify the critical parameters / settings of explicit solving in Nastran.
- Apply the developed framework on a complicated crash simulation and compare it with linear approaches.

Context

In complex mechatronic systems, the dynamic behaviour plays an important role in the system's performance. As the demand on both the performance and the predictability of new generations of machines grows the need for more complex modelling of dynamic behaviour increases.
When the inherent flexibility of a system's component is important for the result of a dynamical analysis, lumped mass approaches are insufficient. By a modal analysis, using the

Internship overview

- Master Student
- Internships Assignment
- Mechanical / Control Engineering
- Location: Nuenen

Technologies

- NX Nastran
- Finite Element Analysis
- Modeling
- Dynamics
- Lumped mass
- Non-linear
- Time response

Finite Element Method a state space representation of the system can be created to capture this flexibility. This state space can then be used for time simulations and frequency analysis.
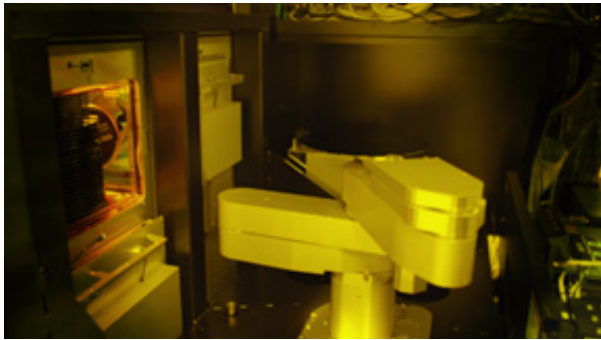
example of high tech system

When the system analyzed is inherently non-linear more complex methods are required. This can originate from complex contact interactions, for example during crashes, or non-linear (large) deformations. Finite Element Analysis using an explicit nonlinear solver allows such complex time-domain problems to be solved.

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Would you like to know more about this student assignment?

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