Examensarbete vid Byggnadsmekanik

MODELLING OF ELASTOMERIC COMPONENTS FOR VEHICLE SYSTEM DYNAMICS MODELS

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BACKGROUND

Elastomeric (rubber) components are used in automotive vehicle for vibration isolation. These components exhibit non-linear stiffness behaviour both staticlly and dynamically. Properties like stress strain relationship as well as pre-load, frequency, amplitude and maybe temperature dependency may be included in a analysis model.
Usually, in vehicle system dynamics models linear properties are used. The thesis work is limited to a frequency range that is below the first eigenfrequency of the bushing.

OBJECTIVE

The objective with the project is:

1. Gain insight in pre-load, frequency and amplitude dependency of elastomeric components.

2. Give directions for future modelling of elastomeric components in vehicle system dynamics models.

METHODS

The thesis project consists of the following main parts:

- *Litterature study.*

- *Description of elastomeric components frequency, amplitude and temperature dependent properties.*

- *Modelling of these properties to systems with few degrees of freedom. Calibration to experiment.*

- *Experimental investigation of cylindrical bushing element. Radial and axial dynamic stiffness and damping are measured. As test specimen the front control arm bushing can be used. The experiment will take place at SAAB NVC.*

- *Implementation of the model in a finite element model. A simple problem in MSC/Nastran is investigated. Especially the amplitude dependency is studied.*

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