

The ITFC control with an MBS Truck Testrig

SIMPACK User Meeting 2007

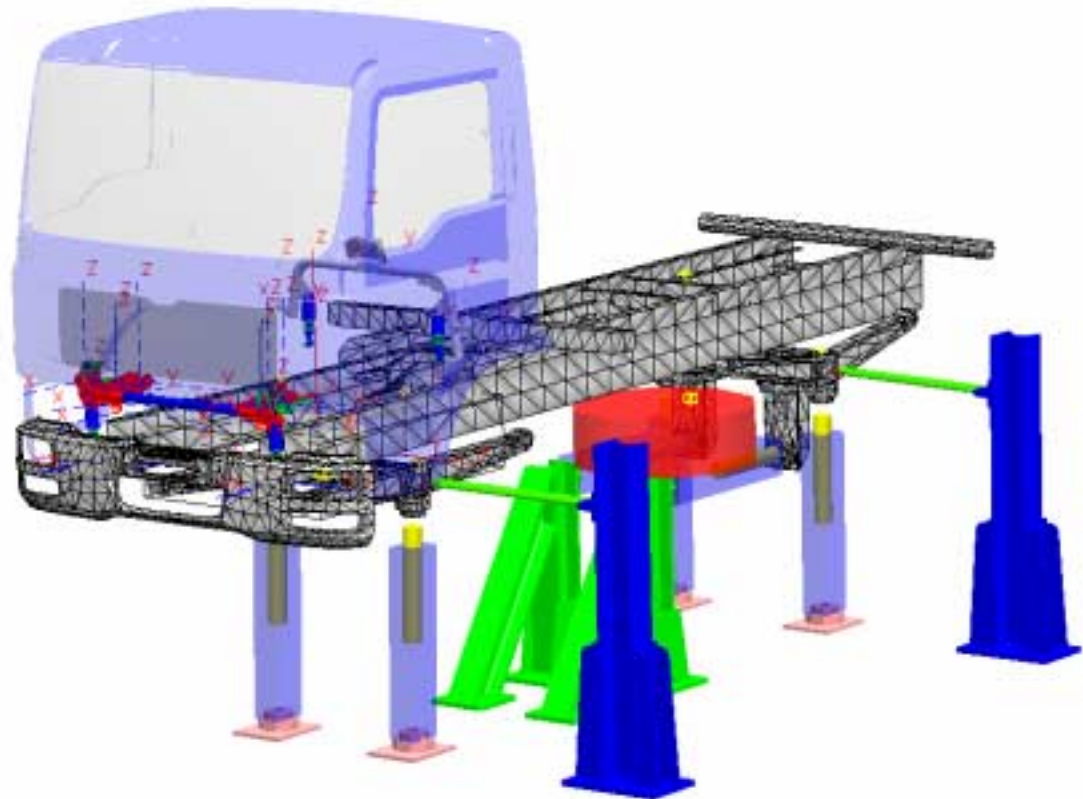


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The ITFC control with an MBS Truck Testrig



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for add-on parts
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Introduction



Testing:

- customer conditions
- test course
- testrig
- virtual testrig

Initial situation

Why a testrig controller?



durability testrig



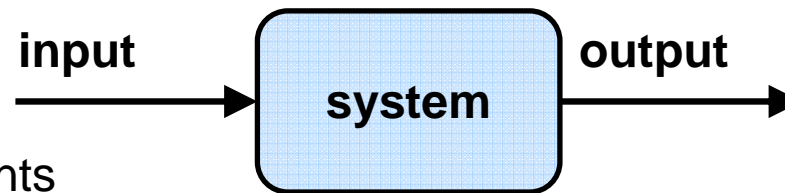
vehicle measurements



unknown:

- cylinder displacements
- forces

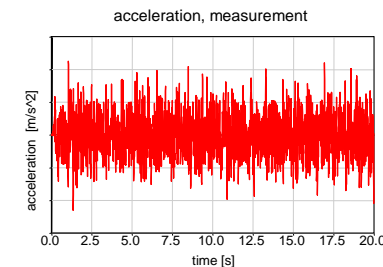
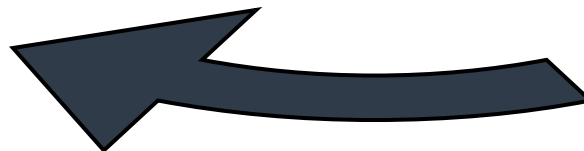
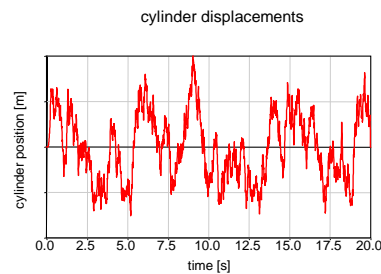
input



output

known:

- accelerations
- strains



ITFC – Theory (I)

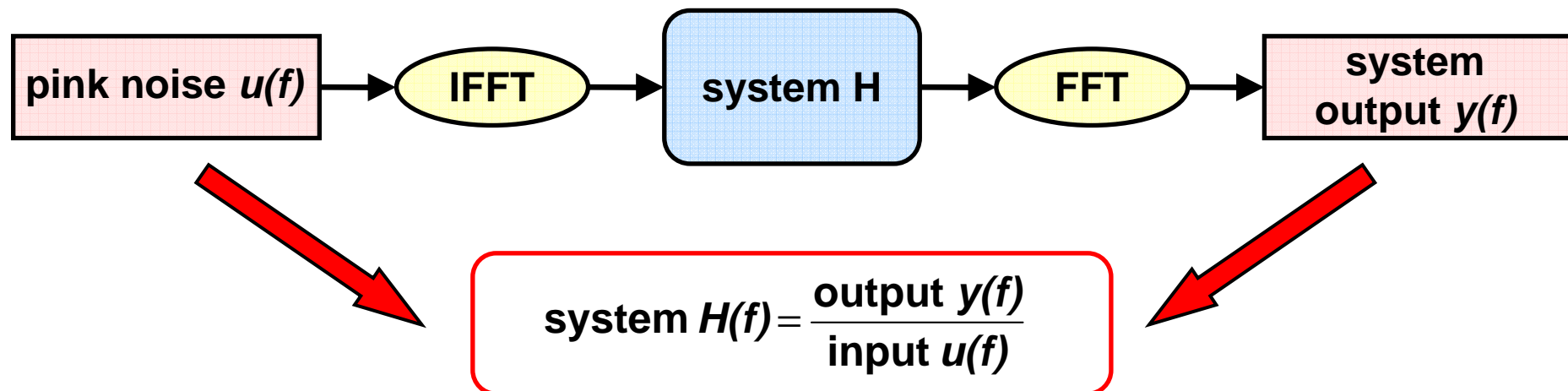
Iterative Transfer Function Compensation



Structure of the ITFC-method:

- 1) System identification
- 2) Iteration

1) System identification

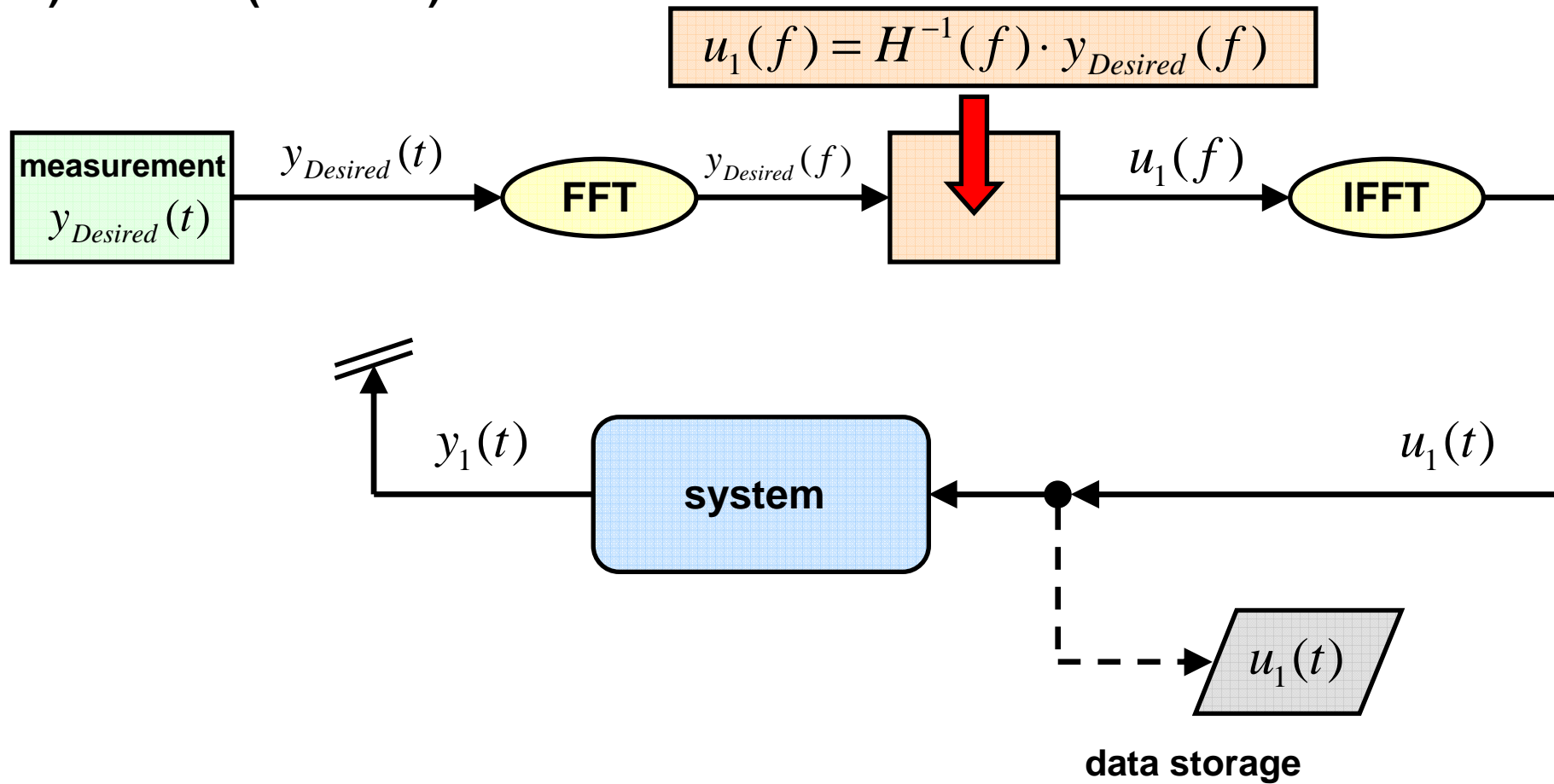


ITFC – Theory (II)

Iterative Transfer Function Compensation



2) Iteration (1st Drive)

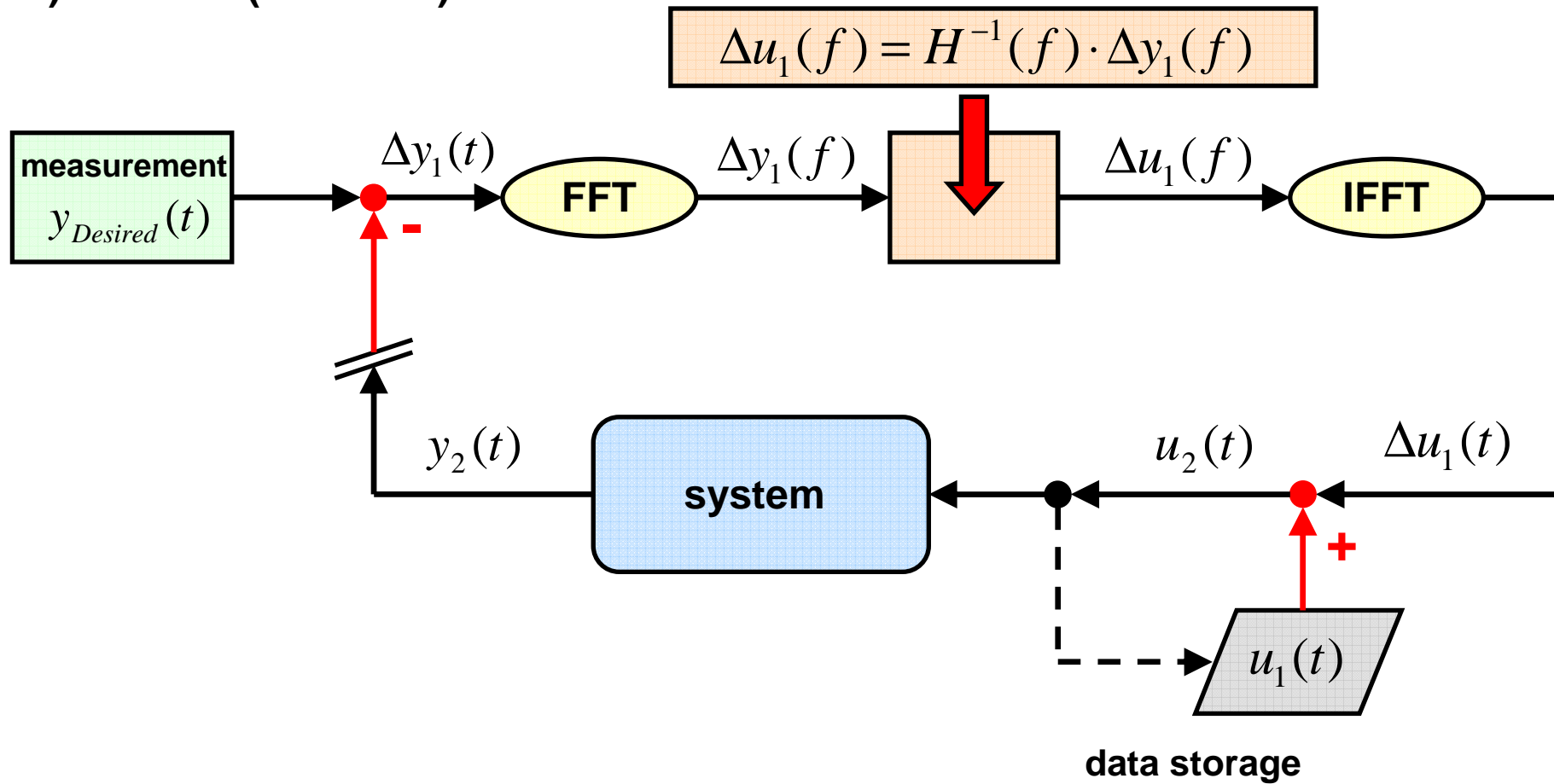


ITFC – Theory (III)

Iterative Transfer Function Compensation

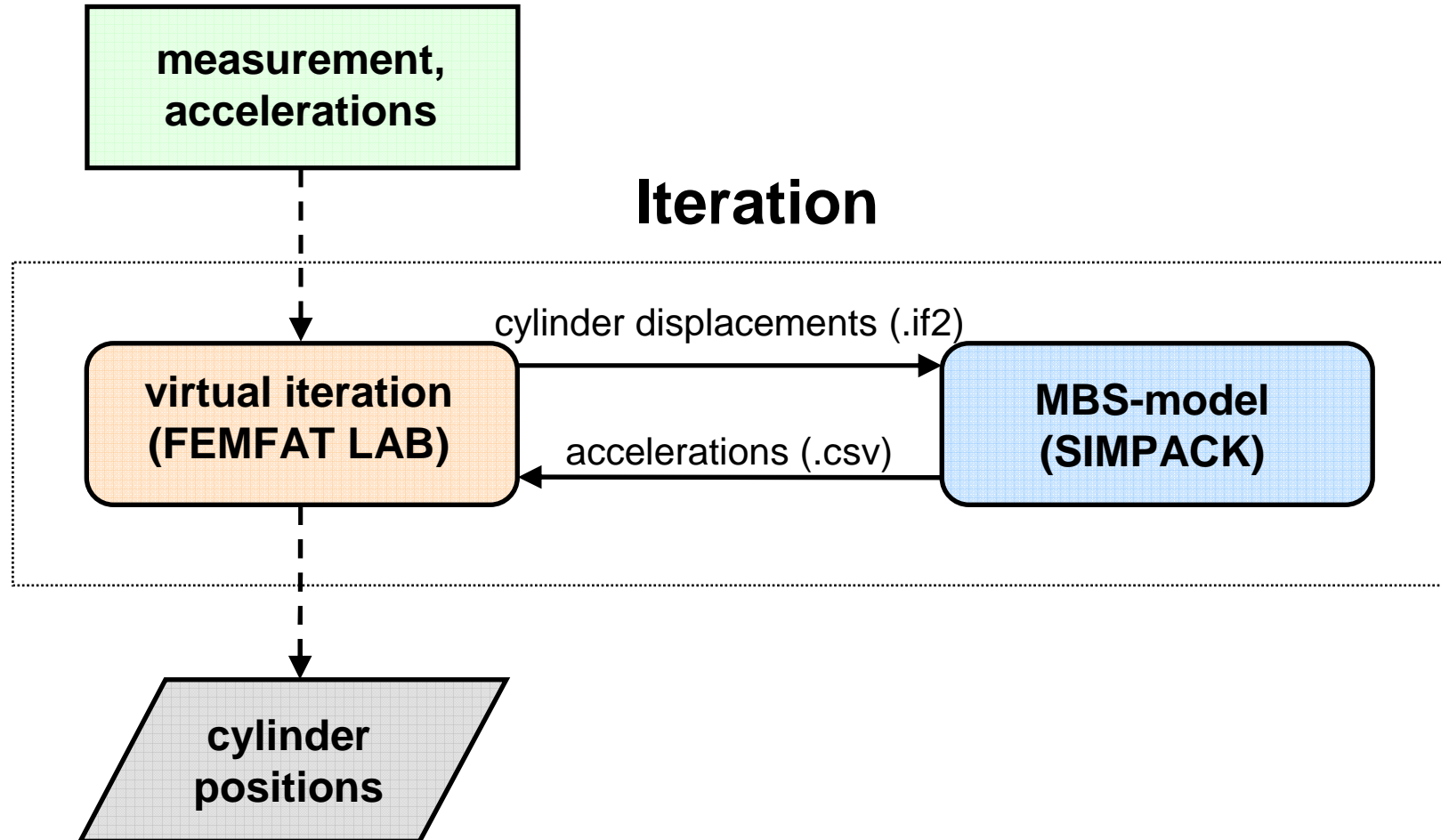


2) Iteration (2nd Drive)



Virtual iteration

SIMPACK – FEMFAT LAB

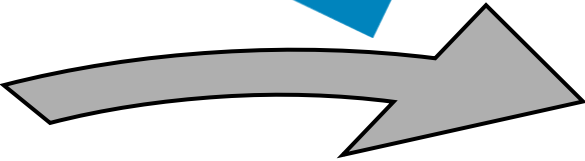
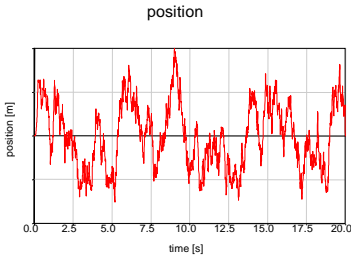


Check of the iteration process

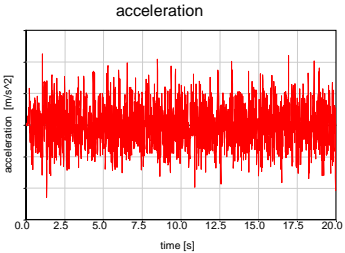
SIMPACK – FEMFAT LAB



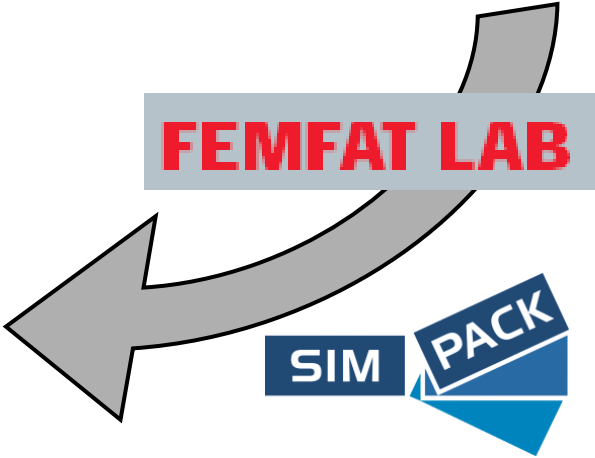
original excitation



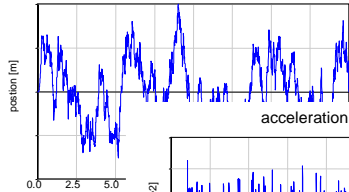
acceleration



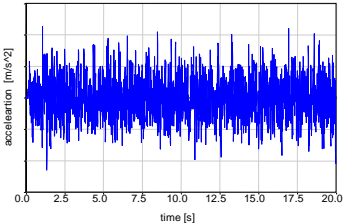
target



excitation

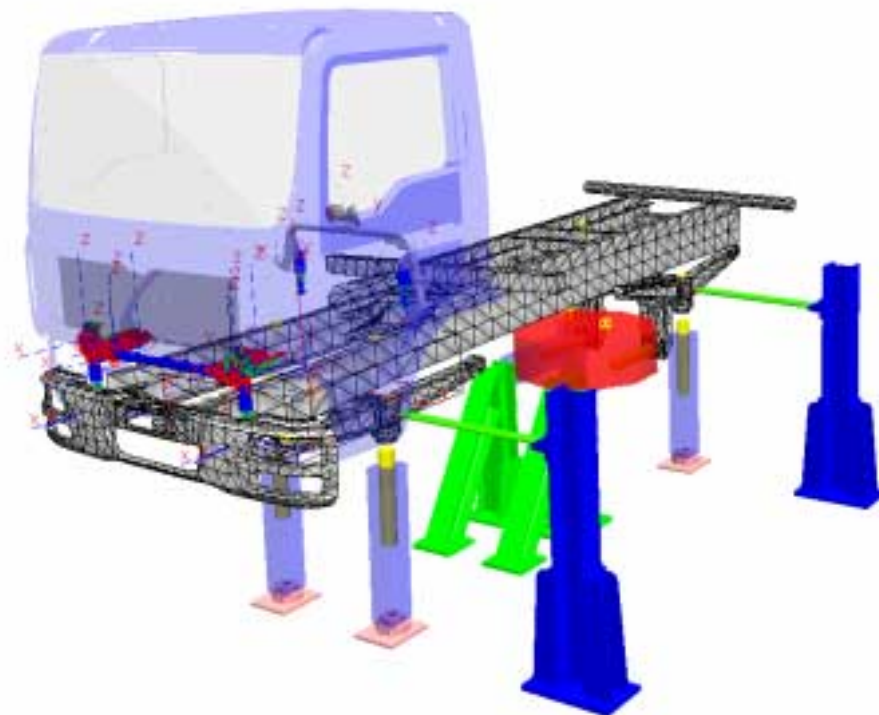


acceleration



Example

Durability testrig for add-on parts

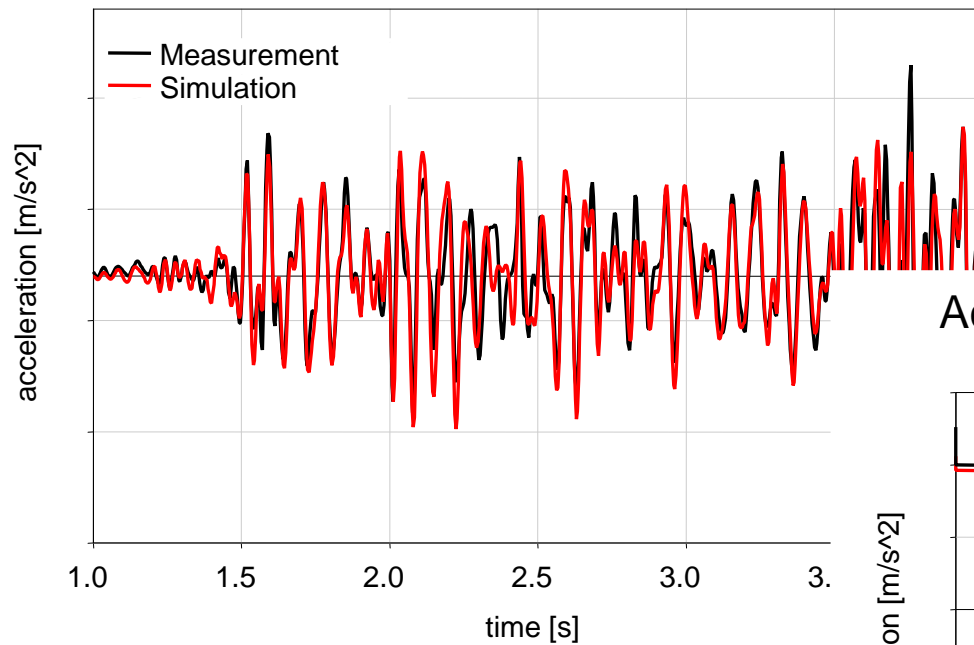


Results:

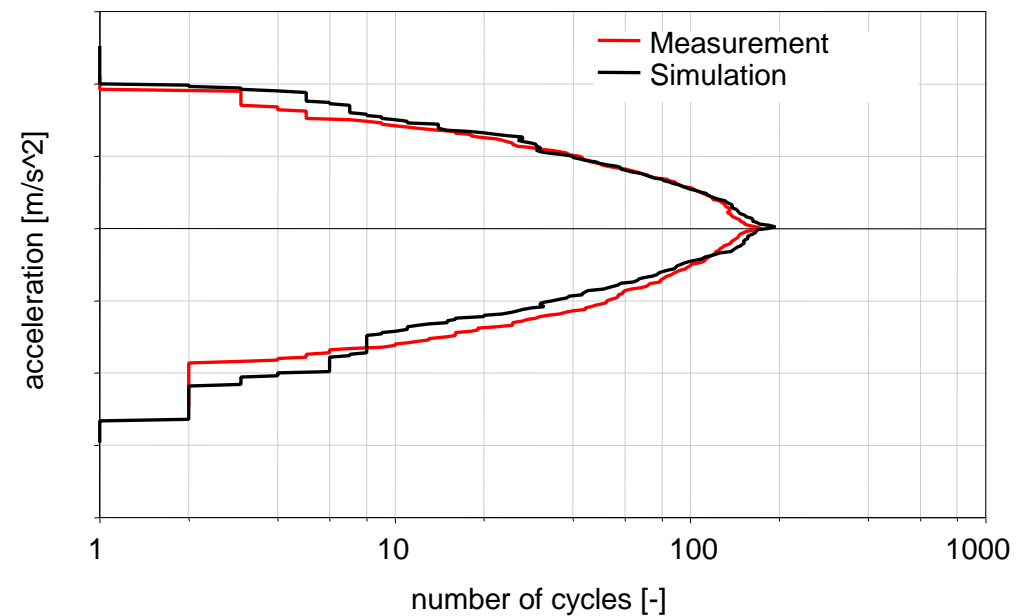
Acceleration of the truck frame



Acceleration of the truck frame (time domain)



Acceleration of the truck frame (levelcrossing)

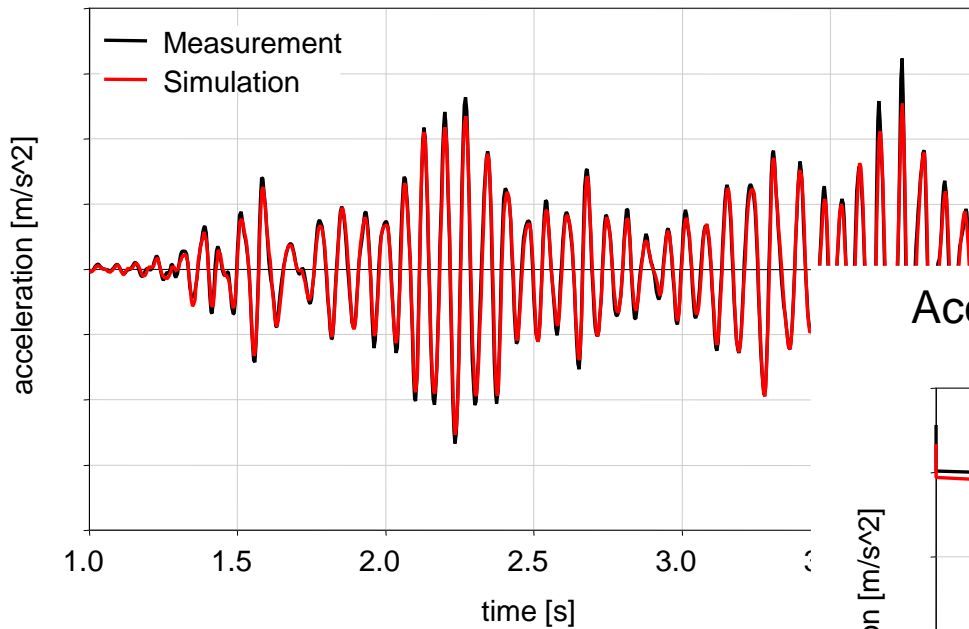


Results:

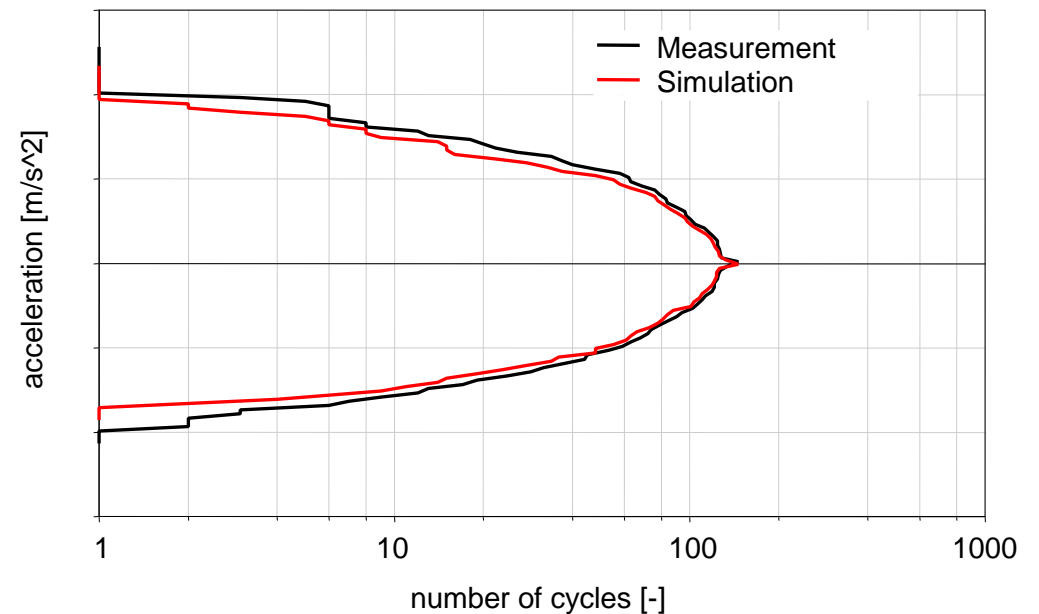
Acceleration of the spare wheel



Acceleration of the spare wheel (time domain)



Acceleration of the spare wheel (levelcrossing)



Benefits of the virtual testrig



- Virtual part optimisation (quality, cost, time) in an early development phase.
- Minimisation of the test loops.
- Reduction of the tool changes.
- Generation of collective loads for the strength calculation.
- Optimisation of the testrig for a good correlation to the reality.

Summary and outlook



Summary:

- Integration of ITFC-control into the SIMPACK-MBS testrig.
- Successful test of the iteration process.
- Application of the ITFC by a truck testrig for add-on parts.

Outlook:

- Construction of further testrigs.
- Use of strains as target signals (virtual strain gauges).

Thank you!

The ITFC control with an MBS Truck Testrig



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