09_Suspension Motion Simulator

Figure 1: General view of the Suspension Motion Simulator with test vehicle


Figure 2: Left front of the test vehicle

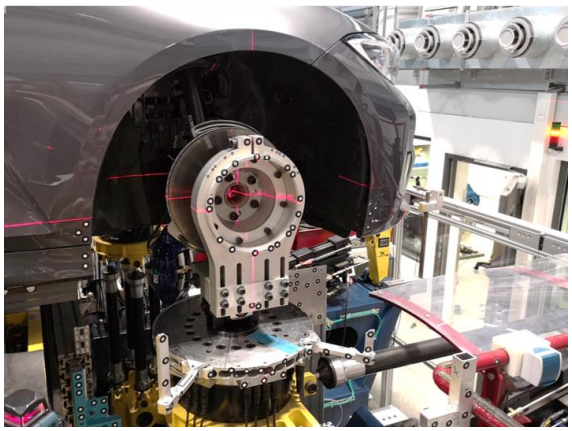
Figure 3: Right front of the test vehicle

Applications

- static and dynamic K&C analyses
- simulation of dynamic maneuvers
- simulation of road profiles
- simulation of theoretical maneuvers (e.g. driving a turn without horizontal forces)
- parametrization and validation of models
- with and without spindle couple
- analysis of the natural frequencies

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Vehicle requirements

Maximum loaded vehicle weight	3,5 t
Track width	1065 – 1900 mm
Wheel base	1500 – 4000 mm
Maximum dimensions	6000 x 2500 x 3000 mm (L x B x H)

Input signals

- Sinus
- Triangle
- Rectangle
- Ramp
- White Noise
- Road profiles

Operating range

Direction	Controlled by position		Controlled by force	
	quasi static <5 Hz	at 30 Hz *		quasi static <5 Hz
X	±100 mm	±5 mm	X	±100 mm
Y	±100 mm	±5 mm	Y	±100 mm
Z	±100 mm	±5mm	Z	±100 mm
Rotation axis Z	±5 °	±0,7 °	Rotation axis Z	±5 °

* Operating range changes based on load and weight.

Measured value, measurement range and tolerances

An optical measurement System (GOM ARAMIS SRX) is measuring the movement of the rim (6 DOF) and the vehicle body/fender (6 DOF) as well as the platforms (6 DOF):

Measuring principle	optical, proximity
Accuracy	±0,04 mm
Real-time output	yes
Number of measuring points (N)	flexible on the suspension
Measuring frequency	1000 Hz

Optionally, the optical measuring system can measure the position changes (6 DOF) of other components (dampers, etc.).

At the platforms all movements, forces and torques are measured:

Measured value	Measurement range	Excess load	Tolerance	Resolution	Linearity	Hysteresis
Fx	±20 kN	±50 kN	±25 N (um 0 kN) ±1 % (0-4 kN)	12 N	±0,3 % FS	±0,3 % FS
Fy	±20 kN	±50 kN	±25 N (um 0 kN) ±50 N (0-4 kN)	12 N	±0,3 % FS	±0,3 % FS
Fz	20 kN	200 kN	±40 N (0-2 kN) ±2 % (2-15 kN)	25 N	±0,3 % FS	±0,3 % FS
Mx	±2 kNm	-	-	2 Nm	±0,3 % FS	±0,3 % FS
My	±2 kNm	-	-	2 Nm	±0,3 % FS	±0,3 % FS
Mz	±2 kNm	-	±5 Nm	1,5 Nm	±0,3 % FS	±0,3 % FS
Track X	±100 mm	-	±0,5 mm	-	-	-
Track Y	±100 mm	-	±0,5 mm	-	-	-
Track Z	±100 mm	-	±0,5 mm	-	-	-
Rot. axis Z	±5 °	-	±0,3 °	-	-	-

Special features

- 20 additional analog inputs for more measured values (e.g. acceleration, temperature, steering wheel angle)
- Measuring with fixed and not fixed vehicle
- Spindle couple for quasistatic and dynamic analysis
- Sprung foundation: 350 t

Location

Fahrzeugtechnisches Versuchszentrum Dresden
Chair of Automobile Engineering
August-Bebel-Straße 32
01219 Dresden
(https://goo.gl/maps/QwMGh6A6cjm)

Contact

Dipl.-Ing. Peter Hoffmann
Email: peter.hoffmann@mailbox.tu-dresden.de
Tel.: +49 (0) 351 / 34529 32837
Fax.: +49 (0) 351 / 463 37066

Dipl.-Ing. (FH) Axel Gerhard, M.Sc.
Fahrzeugsicherheit und Fahrkomfort
Email: axel.gerhard@amf-dresden.de
Tel.: +49 (0) 351 / 647 51944
Fax.: +49 (0) 351 / 463 37066