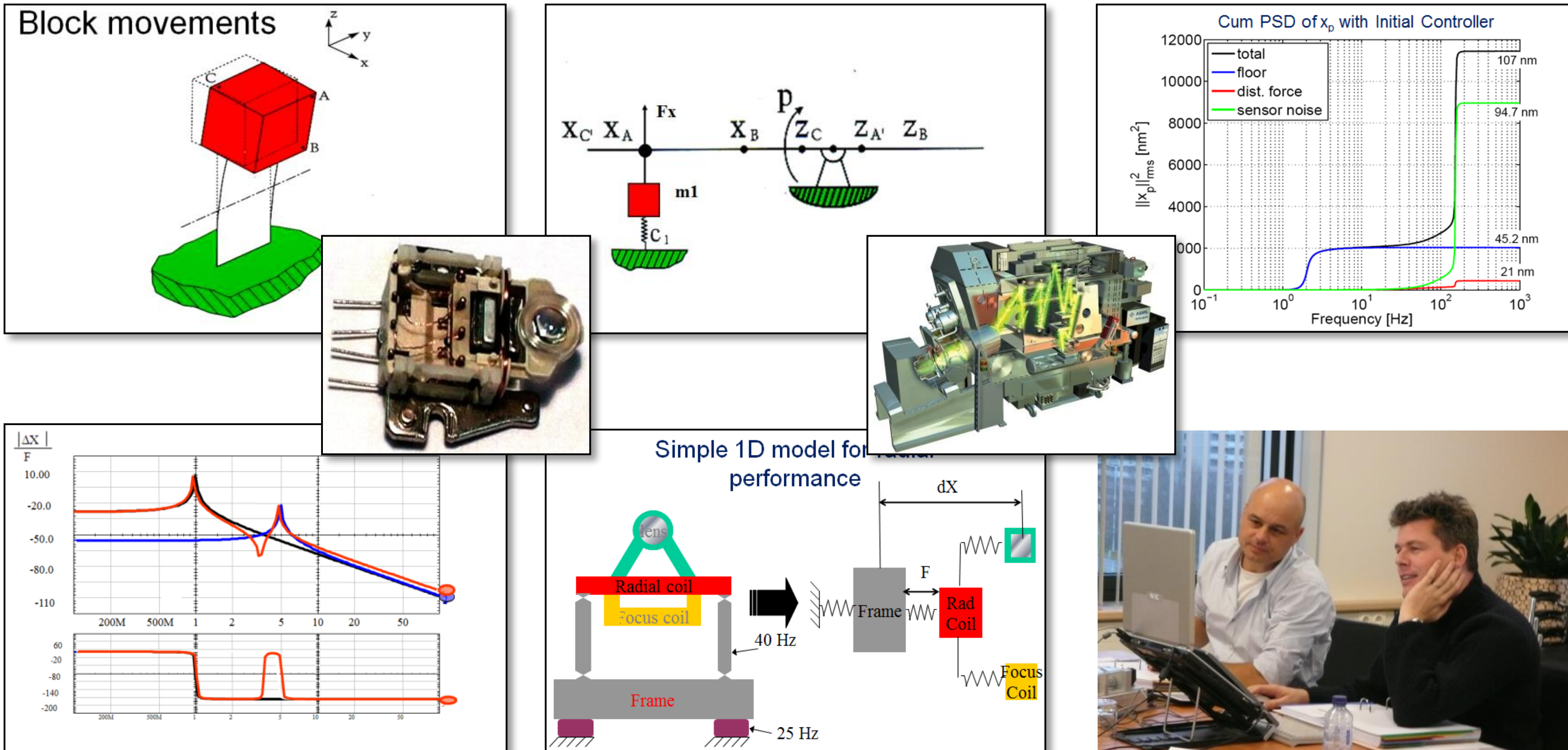
Dynamics and Modelling



Contents

- Mechatronics Training Curriculum
- Details of Course *Dynamics and Modelling*

Mechatronics Training Curriculum

Premium

- Workshop Mechatronics System Design — **On request**

Premium / Advanced

- Advanced Motion Control — **5 days**
- Advanced Feedforward & Learning Control — **3 days**
- Passive Damping for High Tech Systems — **3 days**
- Masterclass Design Principles — **On request**

Advanced

- Advanced Mechatronic System Design — **6 days**

Standard

- Motion Control Tuning — **5 days**
- **Dynamics and Modelling — 3 days**
- Design Principles for Precision Eng. — **5 days**
- Basics and Design for Ultra Clean Vacuum — **4 days**
- Experimental Techniques in Mechatronics — **3 days**
- Metrology & Calibration of Mechatronic Systems — **3 days**
- Actuation and Power Electronics — **3 days**
- Machine Vision for Mechatronic Systems — **2 days**
- Thermal Effects in Mechatronic Systems — **3 days**

Basic

- Mechatronics System Design – part 2 — **5 days**
- Mechatronics System Design – part 1 — **5 days**

Start

<u>Relevant partner trainings:</u>
Applied Optics, Electronics for non-electrical engineers, System Architecture, Soft skills for technology professionals, …

www.mechatronics-academy.nl

Mechatronics Academy

- In the past, many trainings were developed within Philips to train own staff, but the training center CTT stopped.
- **Mechatronics Academy B.V.** has been setup to provide continuity of the existing trainings and develop new trainings in the field of precision mechatronics. It is founded and run by:
  - Prof. Maarten Steinbuch
  - Prof. Jan van Eijk
  - Dr. Adrian Rankers
- We cooperate in the **High Tech Institute** consortium that provides sales, marketing and back office functions.

Dynamics and Modelling

Course Directors / Trainers

Course Director(s) / Trainers

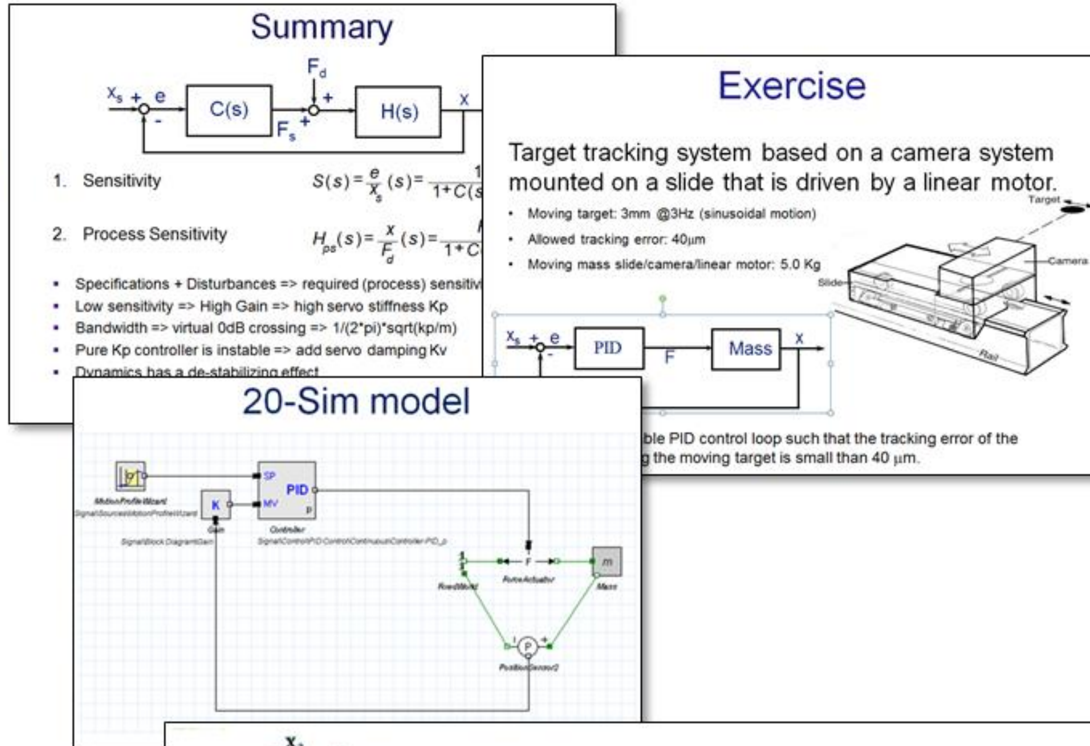
- Prof.dr.ir. Jan van Eijk (MiceBV, Mechatronics Academy)
- Dr.ir. Adrian M. Rankers (Mechatronics Academy)
- Dr.ir. Dick Laro (MI-Partners)

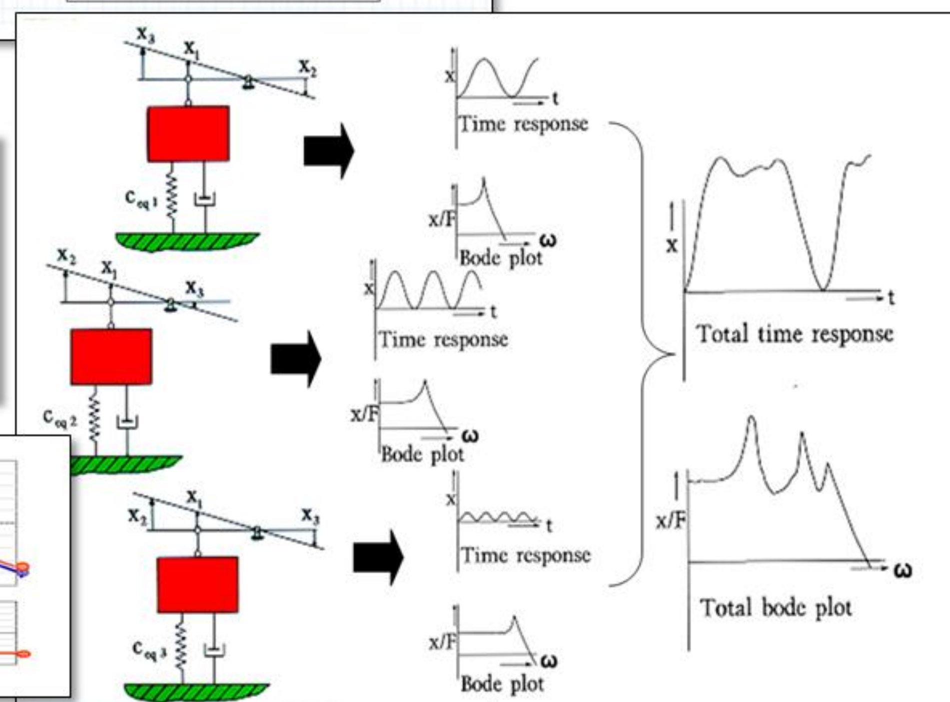
Program

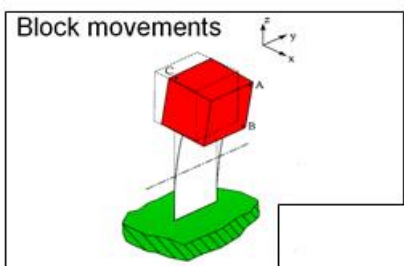
Day	Topic	Presenters
1	• Introduction / Context • Recap control (incl. Exercise 20sim)	Jan van Eijk Adrian Rankers
	• Modal decomposition • Modelling & optimization radial servo Compact Disc actuator	Jan van Eijk & Adrian Rankers
2	• Allowable vibration levels in precision equipment (external and internal sources) • Reducing negative effects (stability & vibration levels) caused by actuator reaction forces.	Adrian Rankers
	• Guiding System Flexibility • Dynamic error budgetting	Jan van Eijk
3	• Floor vibration isolation • Overactuation • Friction	Dick Laro
	• Experimental Modal Analysis • Substructuring / state space / FEM to Matlab • Advanced Feed Forward	Adrian Rankers

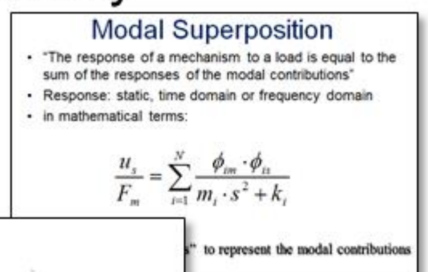
Day 1 (morning)

- Recap Control
- Modal Decomposition
  - Concept
  - Visualization
  - Non-observability
  - Non-controlability

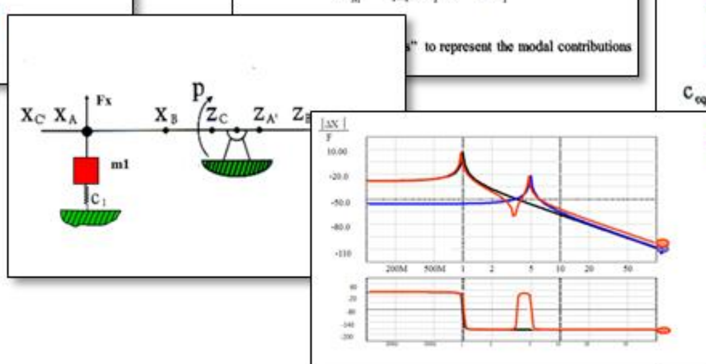








$$\frac{u_s}{F_m} = \sum_{i=1}^{N} \frac{\phi_{im} \cdot \phi_{is}}{m_i \cdot s^2 + k_i}$$



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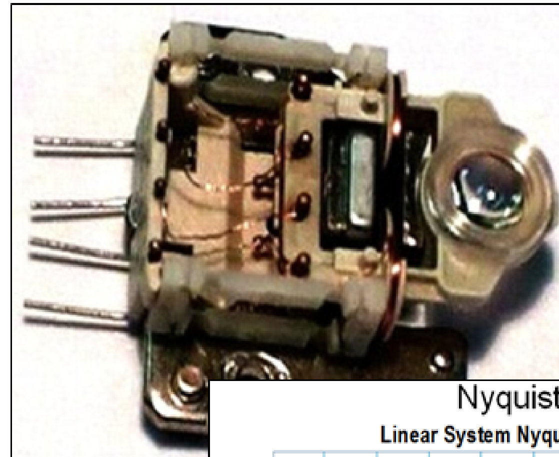
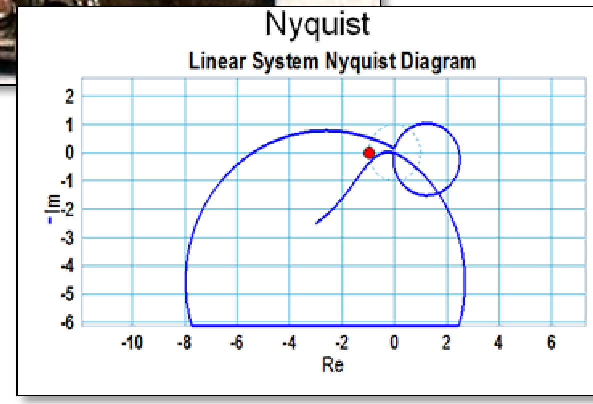
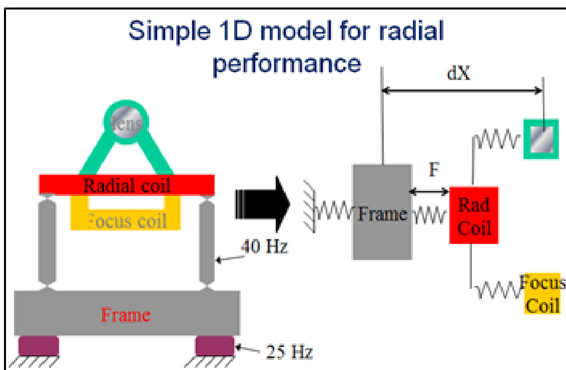
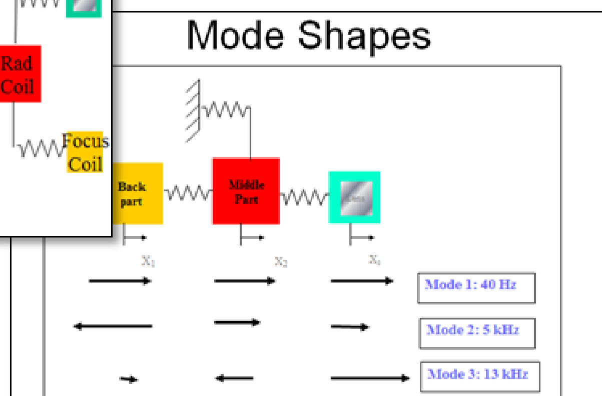
Day 1 (afternoon)

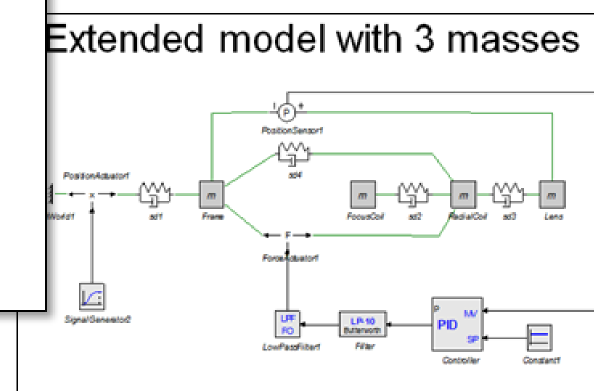
- Conceptual Modelling
- Design/Opt. for Dyn. & Control
- Case: Optical Disc Drive





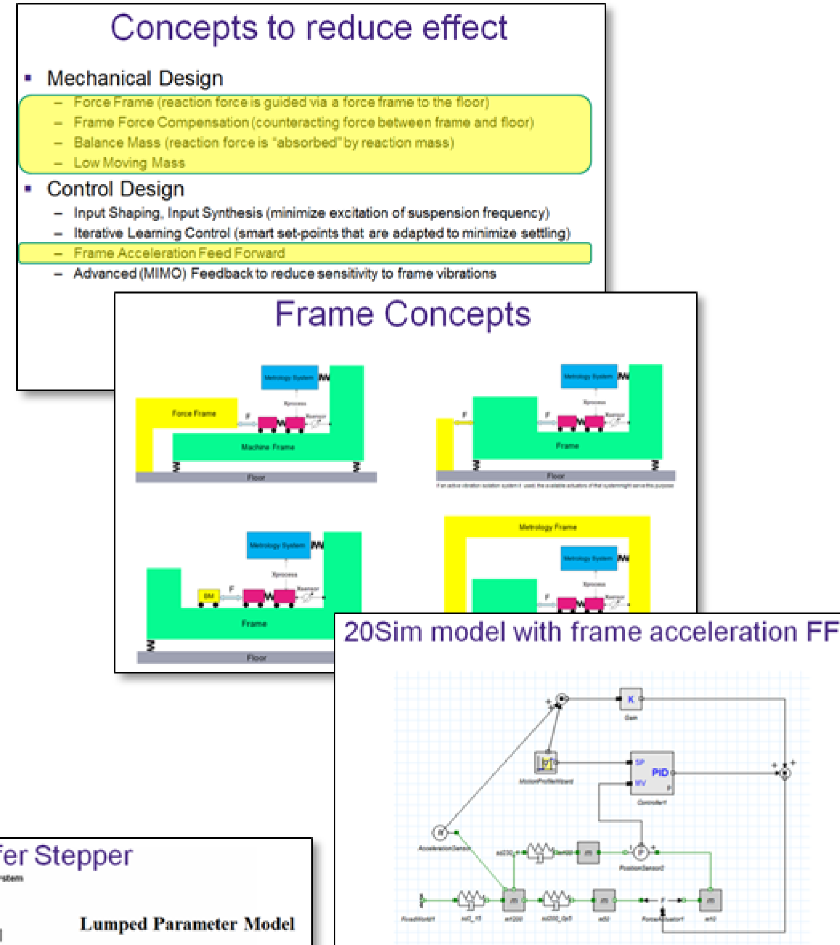


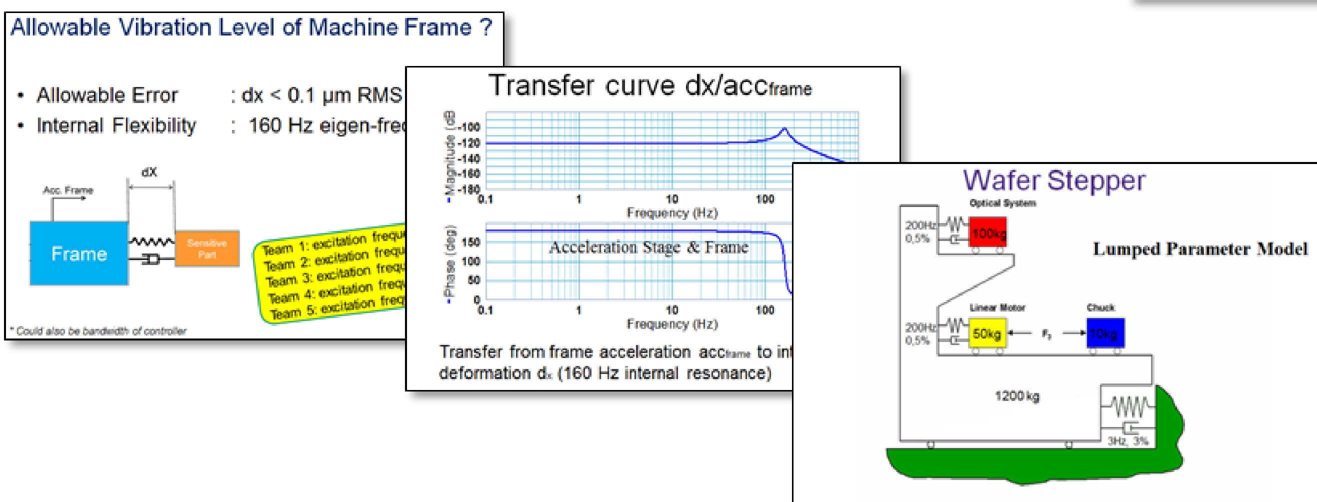




Day 2 (morning)

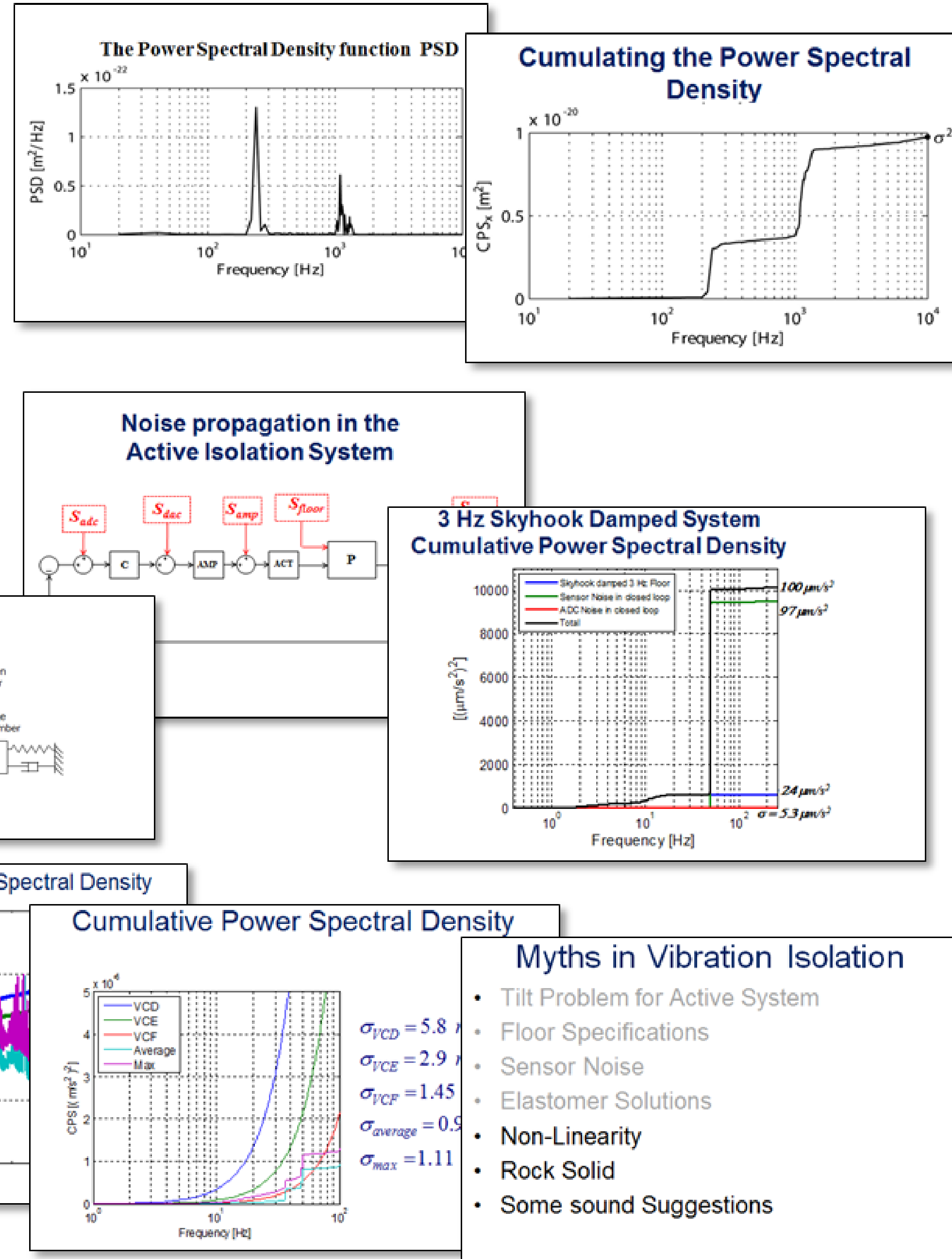
- Allowable vibration levels
- Impact of reactions forces
    - Stability & time response
    - Concepts to reduce effect
    - Simulation Exercises

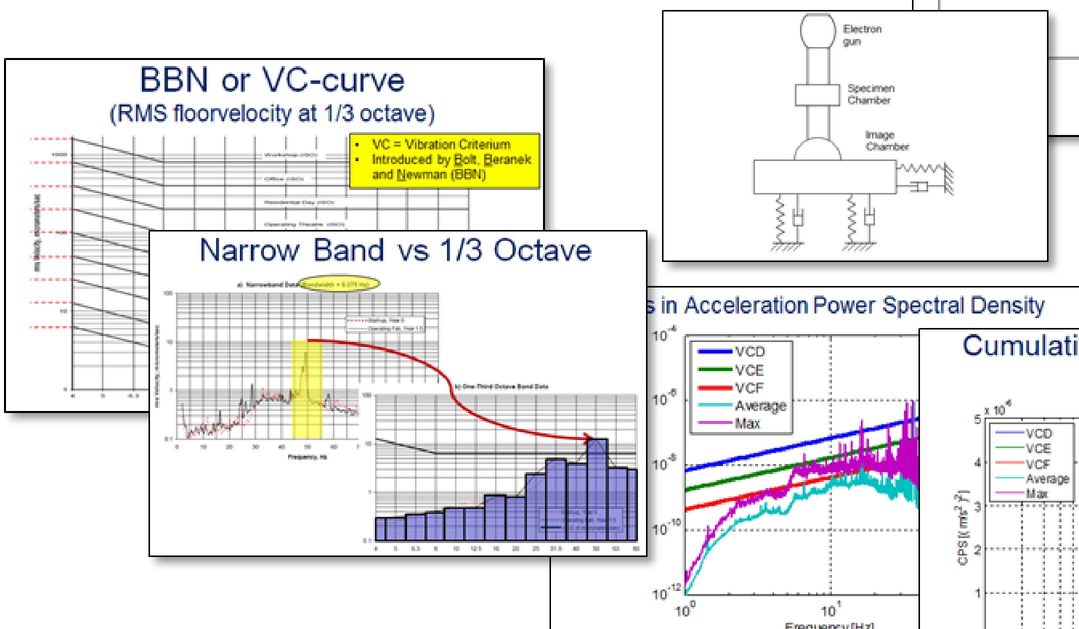




Day 2 (afternoon)

- Dynamic error budgetting
- Floor vibration isolation (layout, spec, modelling)





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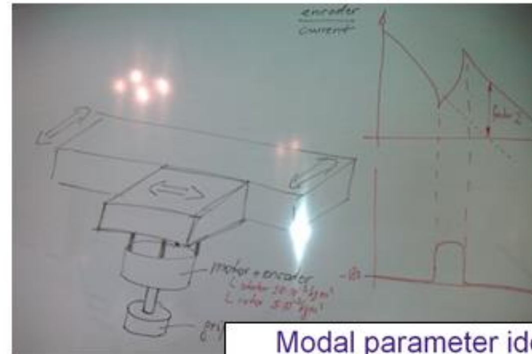
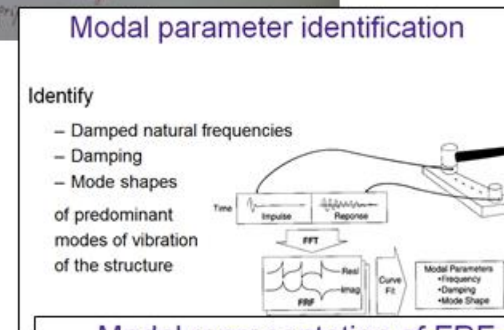
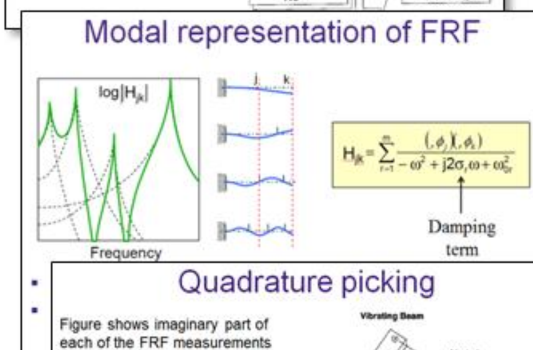
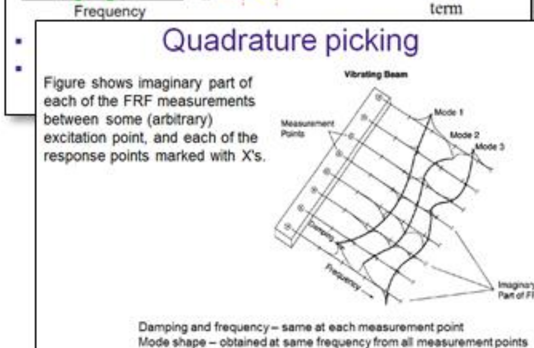
Day 3 (morning)

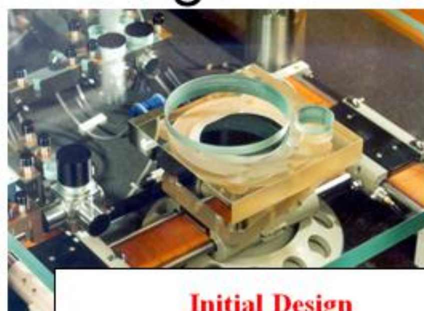
- Experimental Modal Analysis
- Conceptual design of stage concepts

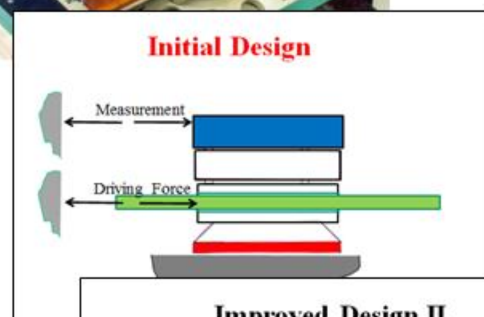


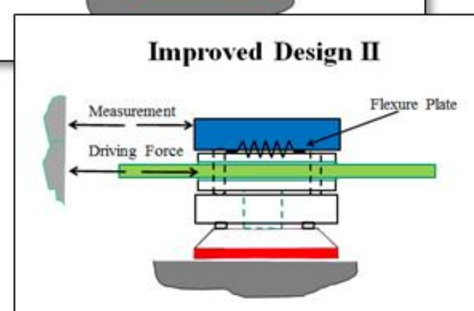


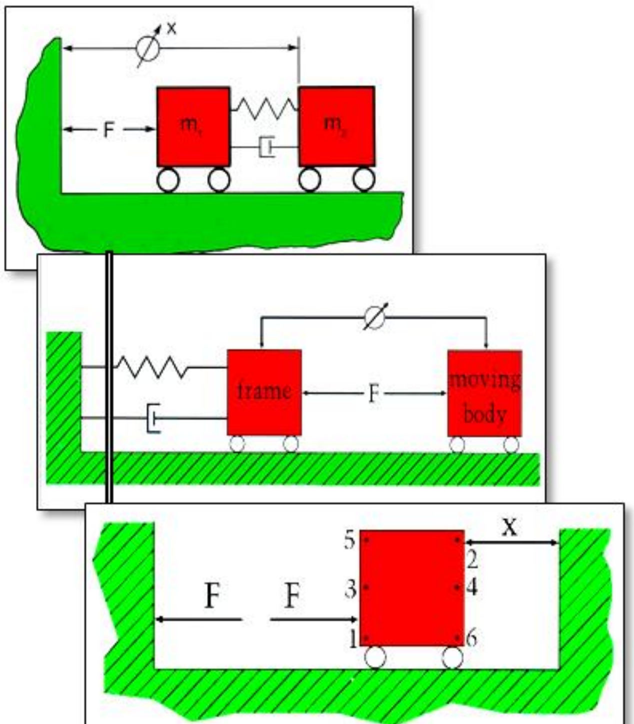






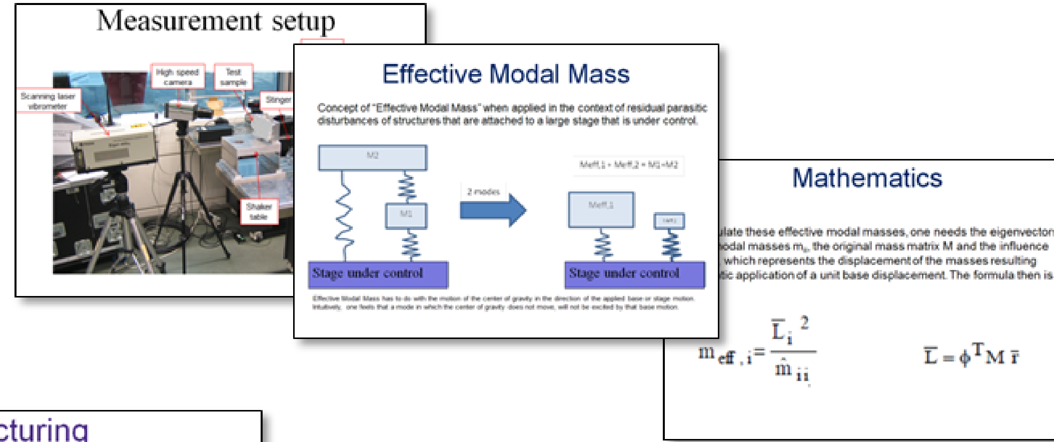


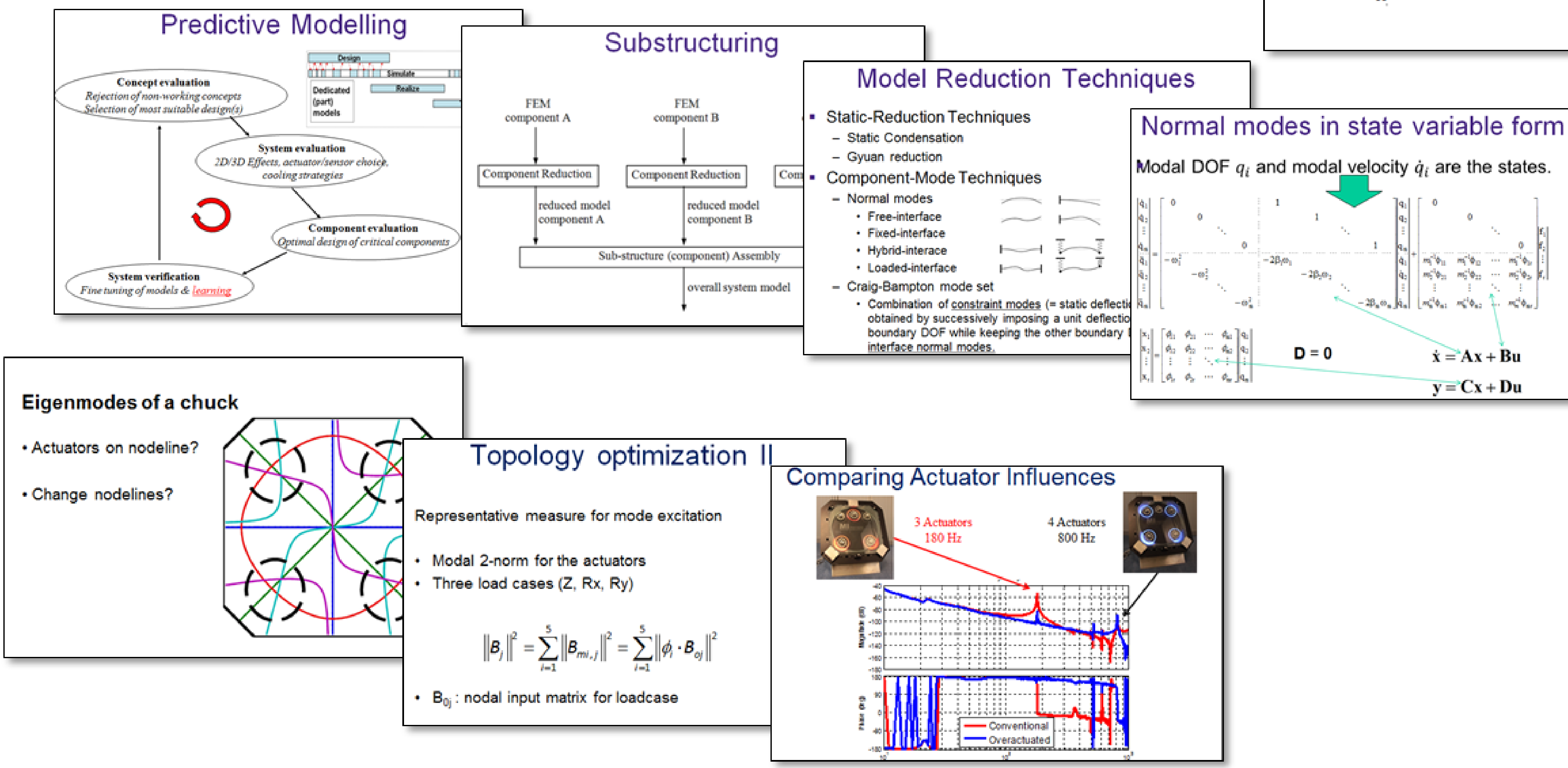




Day 3 (afternoon)

Special Topics





Sign-up for this training

Via the website of our partner

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