Outline of research and educational activities

Michal Kubík

**Supervisor:** Doc. Ing. Ivan Mazůrek CSc.

**Supervisor specialist:** Ing. Jakub Roupec Ph.D.

**Presentation**
19.11. 2014, FME BUT in Brno, Czech Republic
Content

- Research activities
- Dissertation thesis
- Teaching activities
- Learning activities
Semi-active Damping System – FLPP 3

The aim of the project is to develop a semi-active damping system that allows decrease transmission of vibration from launch vehicle to payload.

http://honeywell.com/
Name of my dissertation thesis:
Development of magnetorheological damper for cosmonautics

The goal of the dissertation:
- Development of semi-active MR damper for vibroisolation system in launch vehicle

The sub-goal of the dissertation:
- Development of mathematical models of MR damper
- Design of experimental device
- Experimental verification of mathematical models
- Experimental verification effectivity of MR damper in different isolation systems
Name of my dissertation thesis:
Development of magnetorheological damper for cosmonautics

History of research of Magnetorheological (MR) fluid

- 1940 Rabinow discover MR fluid
- In the 90s was developed first design of MR damper (basic design)
- Boom in research of MR fluid(dampers) began of the 21st century
Name of my dissertation thesis:
Development of magnetorheological damper for cosmonautics

Studies focused on MR valve

- Design of MR damper
- Hydraulic model of MR damper
- MR fluid (limits of MRF)

1996
Carlson
- First design of MR damper

2002
Yang, Carlson
- Velocity profile of MR fluid in magnetic field ➔ Bingham model

Yoo
- Different material of magnetic circuits

2007
Weng
- Velocity profile ➔ Power law model
- Design phase ➔ Bingham model

2000
Carlson
- Properties of commercial MR fluid
- Minimal volume of MRF
- Time response

2005
Goncalves
- Dwell time of MR fluid
Name of my dissertation thesis:
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Hydraulic model of MR damper

Magnetic gap + bypass gap

Development of hydraulic model of MR damper
Name of my dissertation thesis:
Development of magnetorheological damper for cosmonautics

Experimental apparatur
Name of my dissertation thesis:
Development of magnetorheological damper for cosmonautics

Experimental apparatur
Teaching activities

Winter semester

- **5KS** (Machine Design – Machine Elements)

Summer semester

- **6KM** (Machine Design – Mechanisms)
- **QEM** (Experimental Methods)
- **ZIP** (Design Project)
Learning activities

- **9MOP** (Methodologies of Scientific Work)  OK
- **9VPR** (Research Project and its Management)  OK
- **9AJ** (English for Doctoral Degree Study)  ★
- **9PEX** (Experiment Control by Computer)  ✗
- **9APH** (Applied hydrodynamics)  ✗
Products

Publications

Thank you for your attention

M. Kubík

Institute of Machine and Industrial Design
Faculty of Mechanical Engineering
Brno University of Technology

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