

Faculty of Mechanical Engineering



www.sjf.stuba.sk

Milestones

- 1937 establishment of M. R. Štefánik Technical University
- 1939 changing the name into the Slovak Technical University
- 1940 beginning of autonomous Mechanical Engineering study for 100 students
- 1950 opening of Division of Mechanical Engineering
- 1951 foundation of the Faculty of Mechanical Engineering
- 1991 renamed to the Slovak University of Technology in Bratislava
- 2004 opening of the Training Centre of the Institute for Education PSA Peugeot-Citroën
- 2006 opening of the Centre for Technology Quality Transfer in cooperation with VOLKSWAGEN AG
- 2018 Authorized Training Center for MSC.ADAMS

STU consists of 7 faculties and 1 institute

Faculty of Civil Engineering

Faculty of Mechanical Engineering

Faculty of Electrical Engineering and Information Technology

Faculty of Chemical and Food Technology

Faculty of Architecture

Faculty of Materials Science and Technology

Faculty of Informatics and Information Technologies

Institute of Management

University technological incubator



Since its foundation in the year 1937 more than **160.000** students have graduated. In average, **12.000** students study at the STU every year.

Faculty of Mechanical Engineering

Number of academic staff – 150

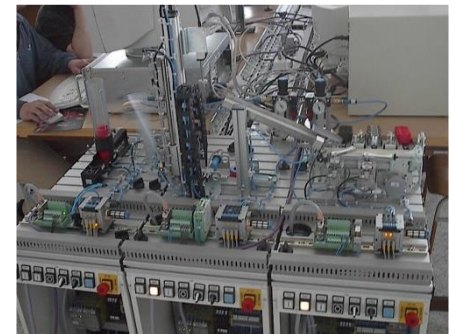
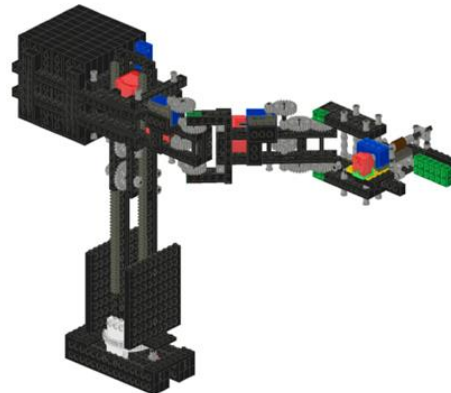
Number of Institutes – 9

- Institute of applied mechanics and mechatronics
- Institute of automation, measurements and applied informatics
- Institute of technologies and materials
- Institute of transport technology and designing
- Institute of manufacturing systems, environmental technology and quality management
- Institute of chemical and hydraulic machines and equipment
- Institute of thermal power engineering
- Institute of mathematics and physics
- Institute of languages and sports
- Computer and information centre
- Centre of innovations

Accredited study programmes in Slovak and **English**

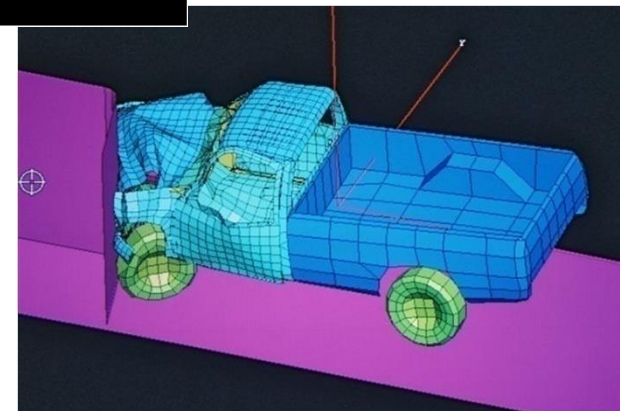
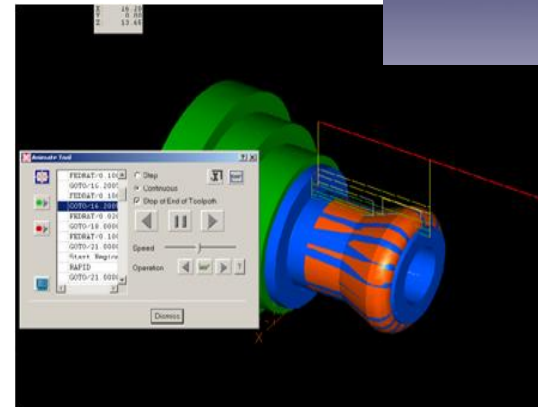
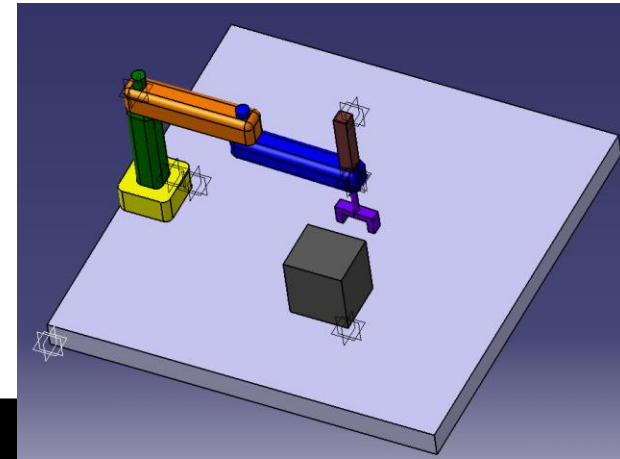
BACHELOR STUDY (Bc.)

- **Applied Mechanics and Mechatronics**
- Automation and Informatics of Machines and Processes
- Automobiles and mobile machines
- Energy Machines and Equipment
- Production systems and Quality Management
- **Production Processes and Materials**
- Process and Environmental Engineering
- Professional bachelor programme for automobile industry
- **Measurement and Quality Management in Mechanical Engineering**



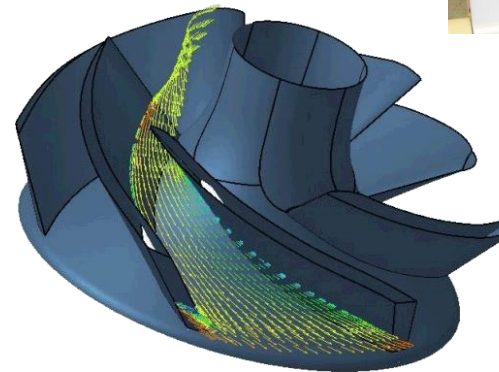
MASTER STUDY (Ing.)

- **Applied Mechanics and Mechatronics**
- Automation and Informatics of Machines and Processes
- Automobiles and Mobile Machines
- Energy Machines and Equipment
- Machines and Equipment for Chemical and Food Industries
- Measurement and Testing
- Production Processes and Materials in Mechanical Engineering
- Process and Environmental Engineering
- Thermal Power Engineering
- **Production systems and Quality Management**



PhD. STUDY (PhD.)

- **Applied Mechanics**
- Automation and Informatics of Machines and Processes
- Automobiles and Mobile Machines
- **Metrology**
- Process Engineering
- Production Processes and Materials in Mechanical Engineering
- **Production Systems and Equipment**
- Energy Machines and Equipment



Admission Procedure Criteria

- secondary school leaving certificate
- study results (grades and individual achievements) and course load
- diplomas/degrees from competitions and student Olympiads
- overview of junior research activities
- knowledge of foreign languages (Slovak/English language proficiency)

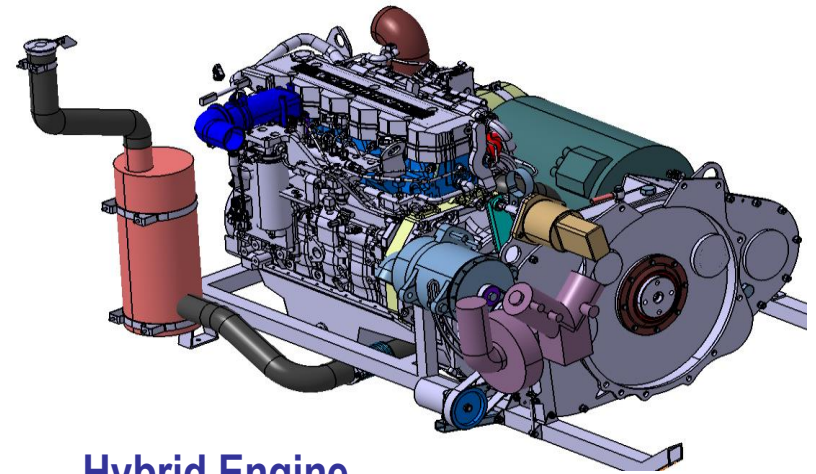
All Information available at the university / faculty webpage

www.sjf-stuba.sk

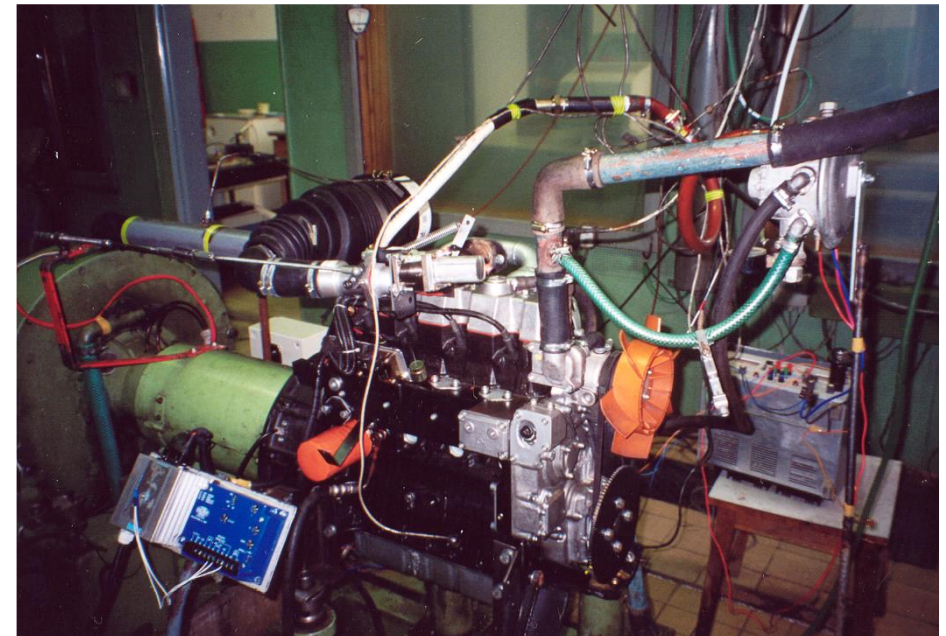
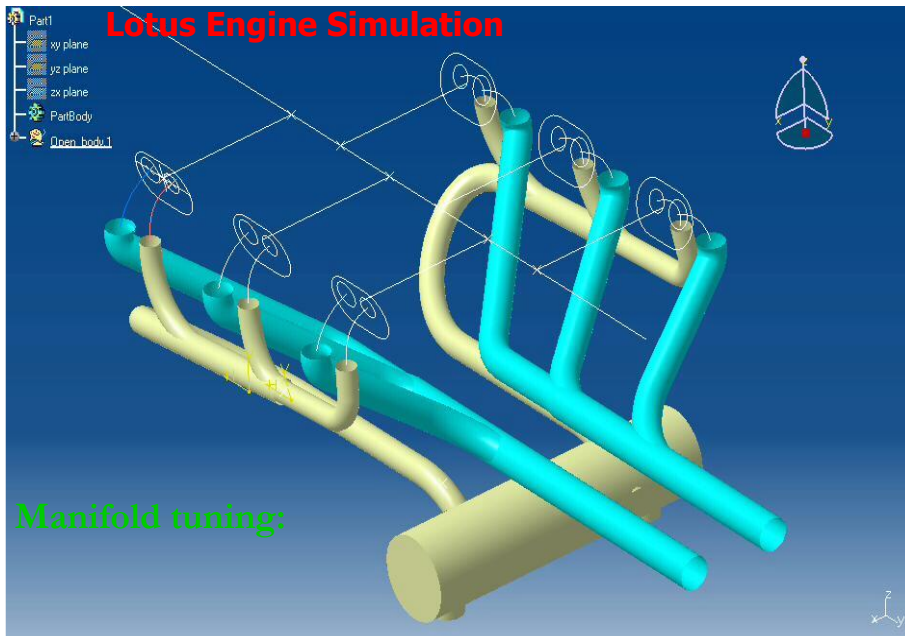
700 students
400 bachelor students
250 master students
50 PhD. students



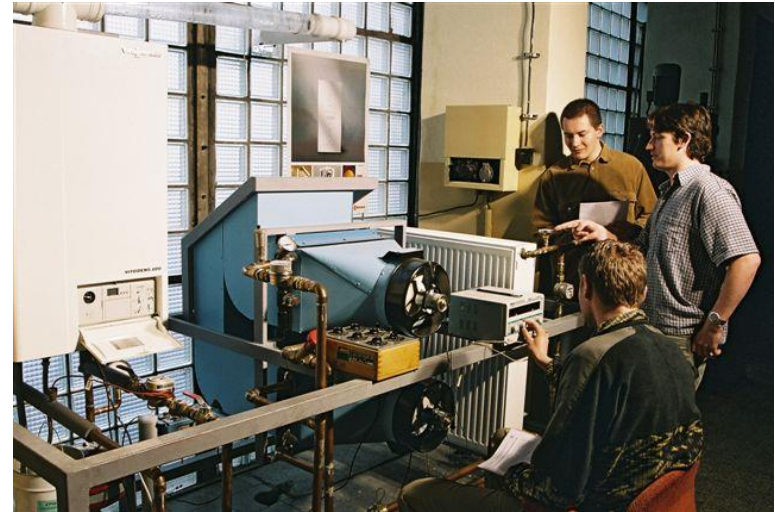
Automotive industry



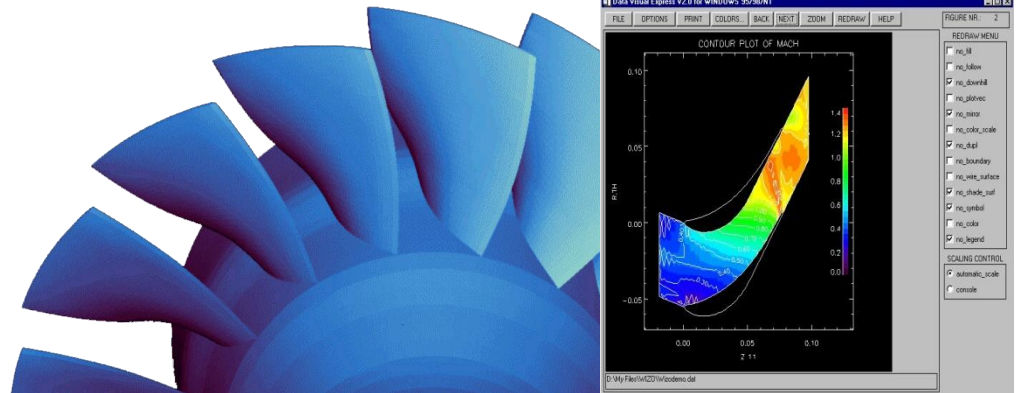
Hybrid Engine



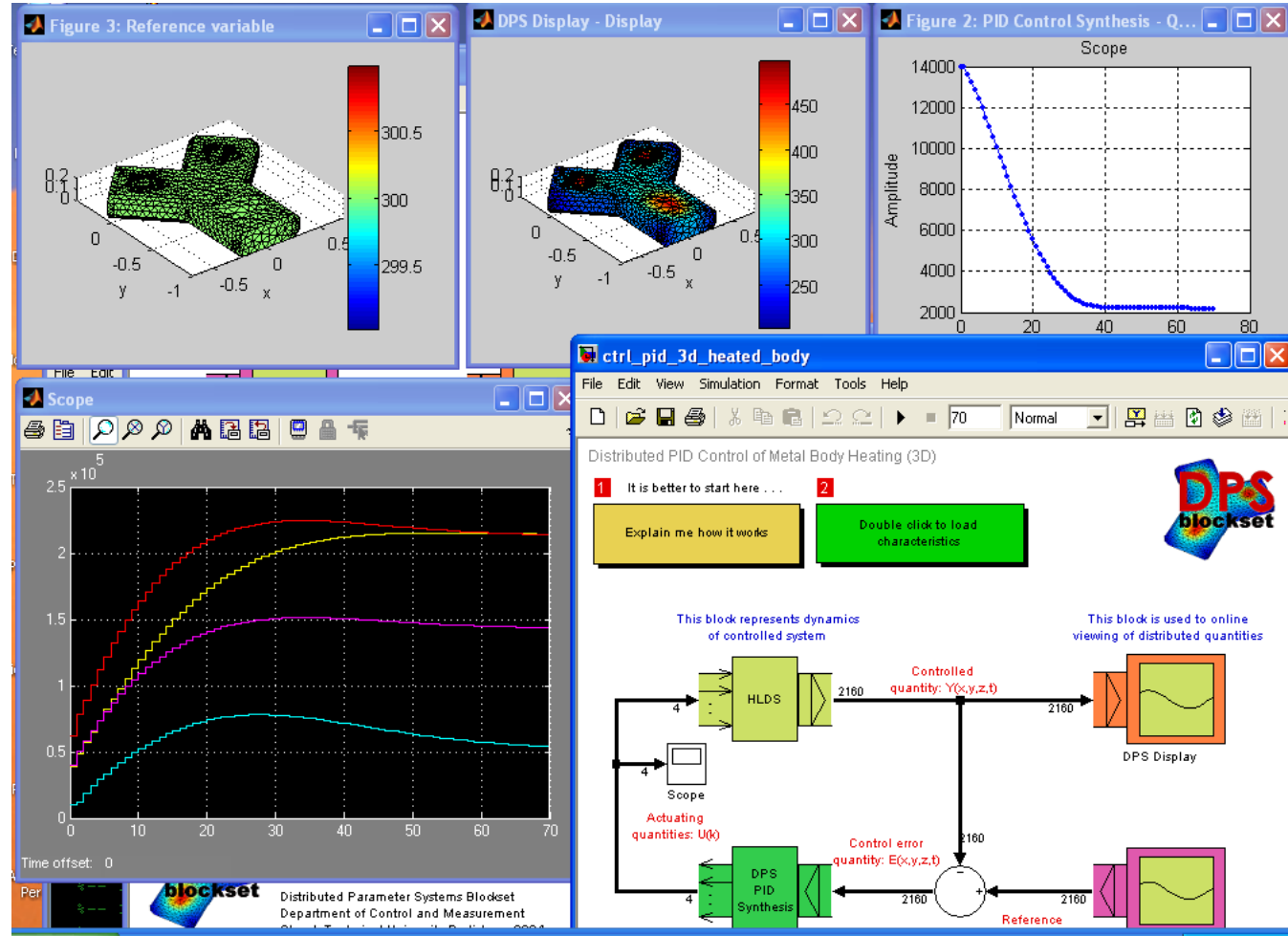
Power engineering



Laboratory of thermal energetics



Mechatronics

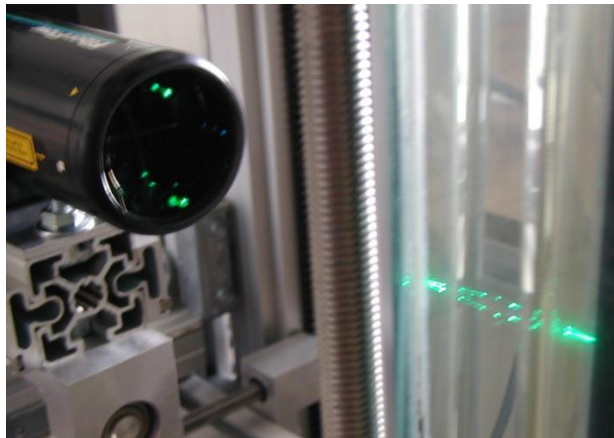


Control of Machines and Processes using advanced software solutions

Process Engineering

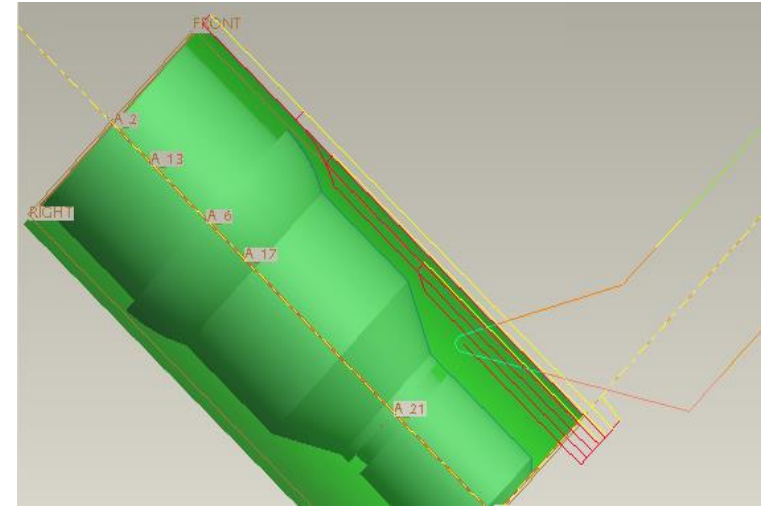
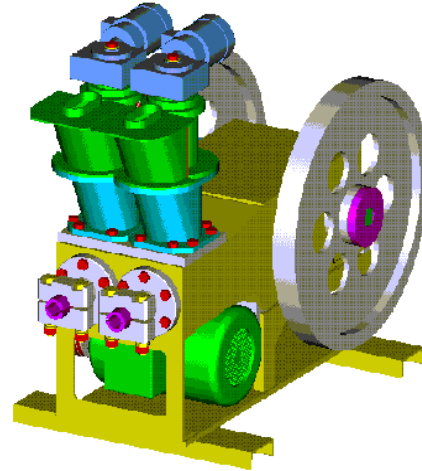


Processes of separation



Laser-Doppler anemometry

Production systems and Quality management



CNC machines and production laboratories

CAD/CAM systems



Training Centre Institute for Education PSA Peugeot-Citroën



Centre for Technology Quality Transfer in cooperation with VOLKSWAGEN AG


Wenzel LH 87 CNC



Hommel Tester Form 1004/350



AUTHORIZED TRAINING CENTER FOR MSC.ADAMS

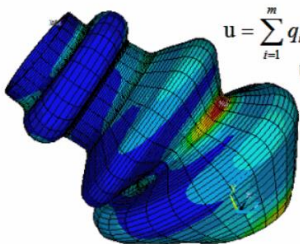
ATC STUDY PROJECTS CONTACT LINKS

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Intro
Offer
MCS.ADAMS

Authorized Training Center for MSC.ADAMS

STU
SjF
SLOVAK UNIVERSITY OF
TECHNOLOGY IN BRATISLAVA
FACULTY OF MECHANICAL
ENGINEERING

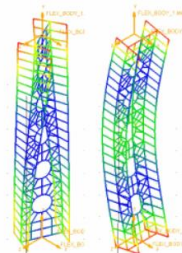


$$\mathbf{u} = \sum_{i=1}^m q_i \phi_i$$

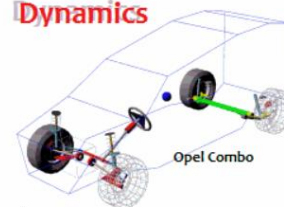
$$\mathbf{u} = \begin{Bmatrix} \mathbf{u}_B \\ \mathbf{u}_T \end{Bmatrix} = \begin{bmatrix} \mathbf{I} & \mathbf{0} \\ \Phi_{IC} & \Phi_{DV} \end{bmatrix} \begin{Bmatrix} \mathbf{q}_C \\ \mathbf{q}_N \end{Bmatrix}$$

MBS with Flexible Bodies

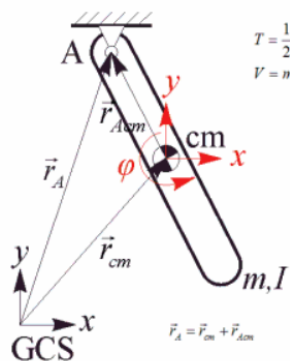
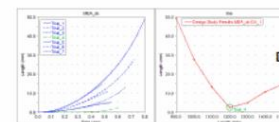
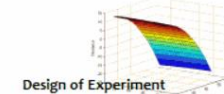
$$\sim = 1x \quad -2x$$



Vehicle Dynamics



Optimization



$$\left. \begin{aligned} T &= \frac{1}{2} m \dot{x}^2 + \frac{1}{2} m \dot{y}^2 + \frac{1}{2} I \dot{\varphi}^2 \\ V &= mgy \end{aligned} \right\} L = T - V$$

$$\frac{d}{dt} \left(\frac{\delta L}{\delta \dot{q}} \right) - \frac{\delta L}{\delta q} + \Phi_q^T \bar{\lambda} = \bar{Q}$$

$$\begin{aligned} m\ddot{x} + \lambda_1 &= 0 \\ m\ddot{y} + \lambda_1 + mg &= 0 \\ I\ddot{\varphi} + \lambda_1 l \sin \varphi - \lambda_2 l \cos \varphi &= 0 \\ x - A_x - l \cos \varphi &= 0 \\ y - A_y - l \sin \varphi &= 0 \end{aligned}$$

Backward Euler

$$y_{n+1} = y_n + h \dot{y}_n$$

GSTIFF

$$y_{n+1} = \sum_{m=1}^k \alpha_m y_{n-i+1} + h \beta \dot{y}_{n+1}$$

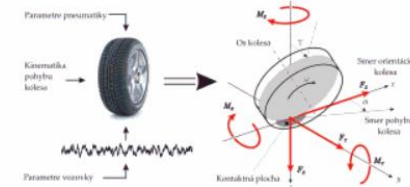
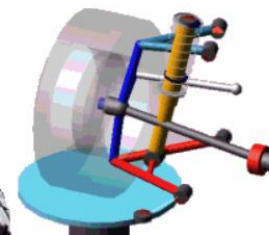
Forward Euler

$$y_{n+1} = y_n + h \dot{y}_{n+1}$$

ODE@DAE Solution

Solver

Tire Modelling



Institute of Mathematics and Physics

10 academic positions

6 – mathematicians

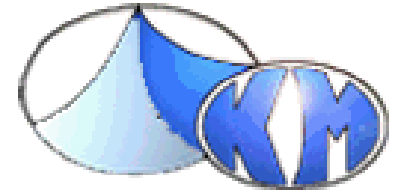
4 – physicists

Fields of scientific research

- Descriptive and differential geometry of manifolds
- Geometric modelling, methods and algorithms of computer graphics
- Statistical methods in production and quality control
- Physical properties of oxid/semiconductors
- Nuclear physics – stability of heavy nuclei and neutron stars
- Education and didactics of mathematics and physics

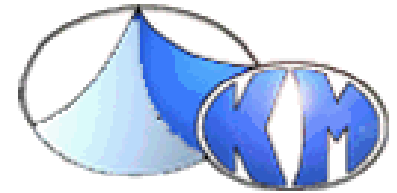


Institute of Mathematics and Physics

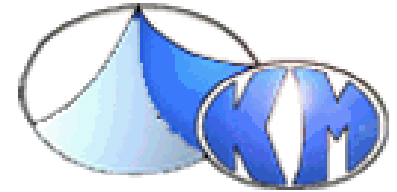


Partner and coordinator of international projects

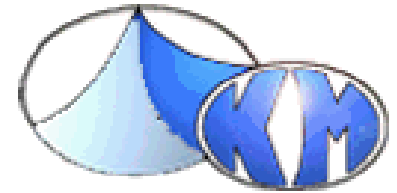
- **Erazmus+ Partnership for Cooperation**
Project No. 2021-1-RO01-KA220-HED-000032258
PYTHAGORAS, years 1.2.2022 – 31.1.2025
coordinator: Lucian Blaga University of Sibiu, Romania
- **Erazmus+ Partnership for Cooperation**
Project No. 2021-1-RO01-KA220-HED-000032258
DIGI STEM, years 1.12.2021 – 1.12.2024
coordinator: Tampere University of Applied Sciences, Finland
- **Erazmus - Strategic Partnership**
Project No. 2017-1-PT01-KA203-035866
DrIVE MATH, years 2017 – 2020
coordinator: PTEI Porto, Portugal



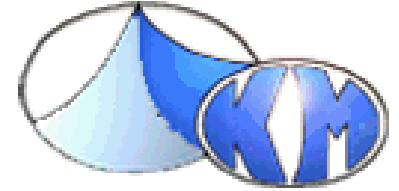
- **Erazmus - Strategic Partnership**
Project No. 2017-1-LT01-KA202-035177
[DIAD-tools](#), years 2017 – 2020
coordinator: Vilniaus statyb. rengimo centras, Lithuania
- **Erazmus - Strategic Partnership**
Project No. 2017-1-ES01-KA203-038491
[Rules_Math](#), years 2017 – 2020
coordinator: Salamanca University, Spain
- **Erazmus - Strategic Partnership**
Project No. 2015-1-FI01-KA203-009044
[Future Mathematics](#), years 2015 - 2018
coordinator: Tampere University of Applied Sciences, Finland



- **CEEPUS III Network CIII-HU-0028-11-1718**
Active Methods in Teaching and Learning Mathematics
 years 2009 - 2023
 coordinator: Miskolc University, Hungary
- **International Visegrad Fund project No. 11520208**
International Symposium on Geometry and Graphics
 years 20.8.2015 - 14.2.2016
 coordinator: Slovak Society for Geometry and Graphics, Slovakia
- **Leonardo da Vinci programme project No. SK/06/B/F/PP-177436**
EVLM - European Virtual Laboratory of Mathematics
 years 2006 – 2008
 coordinator: Slovak University of Technology in Bratislava, Slovakia
 partners: Bulgaria, Czech republic, Finland, Hungary, Ireland, Spain, UK



- **FP 7 project**
[GENDERA](#), years 2010 - 2012
coordinator: Hungarian Science and Technology Foundation, Hungary
- **FP 6 project No. 036651**
[WSDebate](#), years 2006 - 2008
coordinator: Hungarian Science and Technology Foundation, Hungary
- **Leonardo da Vinci programme project No. N/03/B/FF/165.011**
[dMath](#), years 2003 - 2006
coordinator: Hogskolen i Buskerud, Norway
- **EU Socrates programme**
Project No. 90196-CP-1-2001-1-NO-Minerva-M
[Xmath](#), years 2002 -2004
coordinator: Hogskolen i Buskerud, Norway



**Erazmus+ Partnership for Cooperation
Project No. 2021-1-RO01-KA220-HED-000032258**

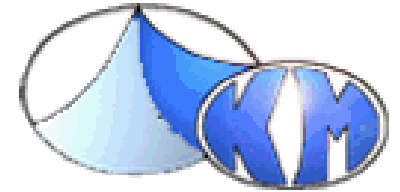
PYTHAGORAS, years 1.2.2022 – 31.1.2025

Coordinator: Lucian Blaga University of Sibiu, Romania

STUBA team

- Doc. RNDr. Daniela Velichová, CSc., mim. prof.
- RNDr. Jana Gabková, PhD.
- RNDr. Viera Záhonová, CSc.
- Mgr. Peter Letavaj, PhD.
- Viera Koníková – admin and technician





Education activities

Bachelor programmes

S1 - Mathematics I, Basics of Programming, Interesting Mathematics and Physics

S2 - Mathematics II, Technical Physics I

S3 - Numerical Mathematics, Technical Physics II

S4 - Basics of Statistical Analysis, Constructive Geometry
Mathematics III, Differential Equations

S5 – Linear Algebra, Numerical Mathematics in Matlab

Master programmes

S7 – Applied Mathematics, Statistical Analyses, Systems of Differential Equations

S8 – Algebraic Structures, Statistical Analysis

PhD. programmes

Selected Parts of Applied Mathematics, Special Differential Equations

Optimisation Methods

Our students and social activities



2006

AM Team - Applied Mechanic Team

Slovak University of Technology in Bratislava

Volunteer students from all study programmes interested in design and construction of student's formula

Formula SAE - is a student design competition organized by the Society of Automotive Engineers (SAE) from 1978



3 years of hard work





Hockenheim 2009 47th position

77 teams, more than 1900 students



HUNGARY 2010



Győr 2011
5th position



Hockenheim 2011
17th position



Silverstone 2011 – 2nd place



Legendary Pat Clark, one of the main organizers, signing our formula awarded for one of the best design in the competition



Formula Student Hungary 2017

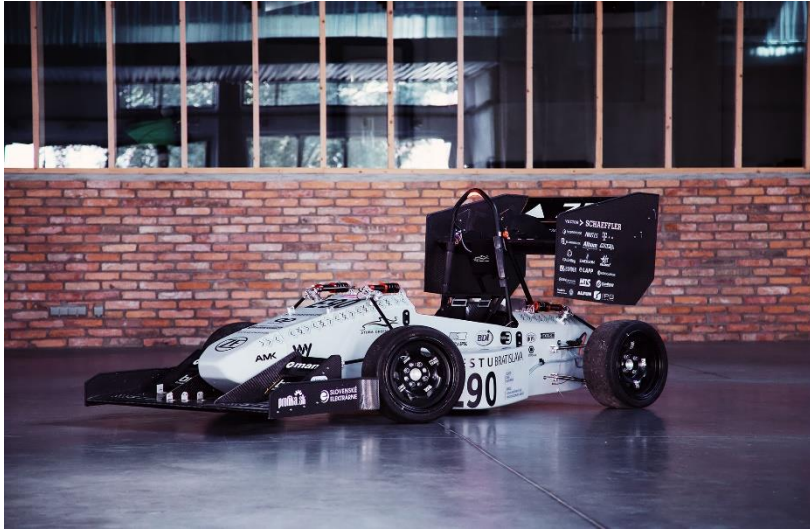


STUBA Green Team 2014

First Slovak Formula Student Electric team







YOU ARE WELCOME

AT STU IN BRATISLAVA

FACULTY OF MECHANICAL ENGINEERING



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