Report of 2017

During 2017 The Finnish National Network on Mathematical Modelling was formed by the following Finnish universities and their departments (in the alphabetical order)

- Lappeenranta University of Technology (LUT), School of Engineering Science.
- Tampere University of Technology (TUT), Faculty of Natural Sciences
- University of Eastern Finland (UEF) Department of Applied Physics (Kuopio)
- University of Eastern Finland (UEF) Department of Physics and Mathematics, (Joensuu)
- University of Jyväskylä (JyU), Faculty of Information Technology.
- University of Oulu (OY), Faculty of Natural Sciences, Department of Mathematical Sciences.

The units/ departments have share their interest and experience in mathematical modelling in order to develop and use mathematical methodology to solve important problems in science, economics and industry. The main activities of the network consist of modelling, simulation, collaboration with industry and society, in terms of projects, modelling weeks, modelling education and study groups

During 2017 the network organized teaching of "Basic Course on Mathematical Modelling", "Continuum models", "Partial Differential Equations in Modelling" for Finnish students. The courses were taught and studied over the Internet with teachers and students from all the six nodes.

The language of education has been Finnish so far, but the aim is to build up an international version of the modelling course(s). In 2017 a Finland-China joint project, "International e-Learning of Mathematical Modeling between Finland and China" supported by CIMO in Finland, was carried out and two international 2-weeks modules for Ordinary Differential Equations Partial Differential Equations were set up and taught.. Aalto University and TUT from Finland, and Shanxi University and Hunan Normal University from China, participated the project. The best student groups will visit China and Finland in 2018.

The network has participated in the ECMI SIG on virtual education lead by Prof. Thomas Götz in Koblenz. There was be a joint study group meeting September 2017 (Uni-Koblenz, SPbSTU, St Petersburg, Kiev Polytechnik, LUT) in Koblenz.

The network participated in the 31st ECMI Mathematical Modelling Week organized by the Department of Computational Engineering and Physics of Lappeenranta University of Technology (LUT), 9-16 July, 2017 at LUT, Lappeenranta, Finland.

The network disseminated information on 19th European Conference on Mathematics for Industry (ECMI 2018) for its members.

Ongoing industrial projects included:

Savon Sellu: "Modelling of time- and moisture-dependent failure of paperboard packages" with savon Sellu (LUT)

Project with defense sector "Long-distance passive Doppler-only tracking of aircraft" (LUT)

TUT has participated in many industrial projects. Industrial partners are many international companies like HERE, Nokia and Microsoft.

LUT participated the Joint study group meeting, September 2016 (Uni-Koblenz, SPbSTU St Petersburg, Kiev Polytechnic, LUT) in St Petersburg

The Network is a member of Mathematics for Industry Networks (https://mi-network.org) and has a representative at COST action management committee.

The council of the network had 8 meetings in 2017.

The network has members in the following organizations

- ECMI Council (Matti Heiliö)
- EU-Maths-In (Seppo Pohjolainen/Matti Heiliö)
- COST: Minetwork (Matylda Jablonska-Sabuka/Simo Ali-Löytty)

Plan for 2018

The Network aims to continue its regular actions and find some new. The web based modelling education will continue.

The Basic Course of Mathematical Modelling will be renewed, updated and translated into English so that it will be available also for foreign students.

The network will carry on developing international eLearning between Finland and China and participate in ECMI SIG on virtual education lead by Prof. Thomas Götz in Koblenz.

A special session on Industrial Mathematics will be organized in Finnish Mathematical Days 4-5.1. 2018, University of Eastern Finland, Joensuu. The president of EU-MATHS-IN, Wil Schilders is invited to give a presentation in this session.

A special workshop on Industry and Mathematics will be planned and organized probably in 2019.

The network continues to participate in the following COST networks:

Investigation and Mathematical Analysis of Avant-garde Disease Control via Mosquito Nano-Tech-Repellents' http://www.cost.eu/ COST_Actions/ca/ CA16227. Representatives from LUT. prof Heikki Haario, PhD student Anna Schcerbacheva. A COST training workshop next year in Finland is planned.

TU1304 Wind Energy Technology Reconsideration to Enhance the Concept of Smart Cities (WINERCOST) Time period: 2014-2018 Main web pages: http://www.winercost.com/ Aim and objective: http://www.winercost.com/ index.php/about-winercost/aims-objectives. Representative from LUT: Dr Ashvinkumar Chaudhari

Third COST network is MI-NET with representatives Dr Simo Ali-Löytty (TUT) and Dr Matyda Jablonska (LUT).

Finnish Academy: Meriliikenteen teollinen internet. Industrial Internet and Data Analysis in Marine Industries Researchers: Prof Heikki Haario (LUT) , Dr Marko Laine (FMI) , Dr Antti Solonen (Eniram LTd)

Project title: (MATINE/ Ministry of Defense) Kaukaisten ilmavalvontakohteiden Doppler-seurannan suorituskyvyn mittauksen koelaitteisto. Instantaneous Doppler Signature Extraction from within a Spectrogram Image of a VHF Band. http://ieeexplore.ieee.org/document/7472956/, http://www.defmin.fi/en/ tasks_and_activities/defence_policy/scientific_advisory_board_for_defence/matines_research Researchers: Miika Tolonen, Dr Tuomo Kauranne, LUT School of Engineering.

The network is associated with Finnish Centre of Excellence in Inverse Problems supported by Finnish Academy, with LUT, TUT and UEF/Applied Physics as its members.

The council of the network will have about 8 meetings.