

# Model-Based Fault Diagnosis – A Linear Synthesis Framework using MATLAB



## Andreas Varga

Gilching, Germany

Former Senior Scientist at DLR - Oberpfaffenhofen

<https://sites.google.com/site/andreasvargacontact/home>

[varga.andreas@gmail.com](mailto:varga.andreas@gmail.com)

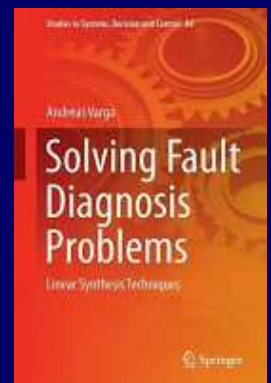
## Summary of the course:

The model-based approach to fault detection and diagnosis has been the subject of ongoing research for the past few decades. The aim of this course is to describe the recent developments in the synthesis procedures of fault detection and isolation filters relying on computational approaches suitable to solve the basic synthesis problems in the most general setting. Freely available MATLAB-based software will serve as basis of computational synthesis experiments.

The course is centred on chapters 1– 8 of the recent book:

**A. Varga, Solving Fault Diagnosis Problems –  
Linear Synthesis Techniques, Springer, 2017.**

The computational experiments are performed using MATLAB-based software developed in conjunction with this book.



## Covered topics:

- Modelling systems with faults
- Basic problems of linear model-based fault diagnosis
- Nullspace-based synthesis paradigm
- Solution of synthesis problems of fault detection and isolation filters
- Solution of synthesis problems of model-detection filters using multiple-model-based techniques
- Computational issues in solving the synthesis problems
- Computational synthesis experiments using MATLAB

## Prerequisites:

Undergraduate-level knowledge of linear systems (described by linear systems of differential equations and transfer-function matrix based input-output descriptions) and basic knowledge of the Control System Toolbox of MATLAB.