High Integrity Systems Project
TSA Tasks 01

Prof. Dr. Matthias F. Wagner
Dr. Fatima Sajid Butt

Winter Semester 2024/2025

Based on the meeting's discussion, here are the first steps, which have to be presented in the next session:

1. Find a detailed mathematical definition of *Time Series*!
2. Please define *Time Series Analysis (TSA)*!
3. Support your definitions with a list and short summary of a first set of publications, which can be found with
   (a) Google Scholar
   (b) arXiv
   (c) IEEE Xplore (via University Library)
   (d) ACM Digital Libraries (via University Library)
   (e) Connected Papers
   (f) ...
4. Please download the e-book from Manu Joseph:
   Modern time series forecasting with Python.
   - Inside university: https://hds.hebis.de/fuas/Record/HEB504580272
   - From outside the university please use VPN (Forticlient):
     https://www.frankfurt-university.de/de/hochschule/bibliothek/fernzugriff/
5. Two other books will be interesting for the course:
   (a) *Deep Learning for Time Series Cookbook: Use PyTorch and Python recipes for forecasting, classification, and anomaly detection.* ASIN: B0CGVMK7K7 Publisher: Packt Publishing; 1st edition (29 Mar. 2024)
   (b) *Data-Driven Science and Engineering: Machine Learning, Dynamical Systems, and Control* (English Edition) by Steve L. Brunton , J. Nathan Kutz ASIN: B0B1N13DDM Publisher: Cambridge University Press; 2nd edition (5 May 2022)
6. Required working environment: PyTorch and Matlab

   (a) Please install PyTorch and Matlab
   (b) Prepare a presentation about the process, including tips and problems!

7. Summarize chapter 1 of the two books
   (a) *Modern time series forecasting with Python*, and
   (b) *Deep Learning for Time Series Cookbook: Use PyTorch and Python recipes for forecasting, classification, and anomaly detection.*

8. **All generated texts must be written in LaTeX**