

Master Thesis:

ATM network awareness through synchronization analysis

Task Description:

The Institute of air transportation systems (together with DLR) is investigating topics that focus on systematic features of air transportation. One of these features is system resiliency. *Resilience* is the capacity of a system to recover from disruptions (also referred as extreme events). Generally, resilience will cover two main areas: first, state definition and then recovery mechanisms. This study will contribute to air traffic management (ATM) network state definition by monitoring corrective actions.

Initial studies proved that temporal dynamics of ATM network are spread across different timescales. Thus the monitoring of related processes at only one selected timescale is not covering the interactions between various air traffic flow management (ATFM) mechanisms. To capture non-linear interactions between such events, method of event synchronization has proved to be efficient in climate studies. In this research the intension is to implement *Multi-scale event synchronization (MSES)* analysis based on ATFM regulations. This master thesis will be supported by ATFM team to go through the following steps:

- Literature Review on ATFM, and MSES,
- Introduction to data structure and related terminology,
- Modeling and case study design,
- Model implementation (MATLAB or Python) and work on regulation data,
- Model validation and presentation of results,
- Discussion of future work and documentation

Requirements:

- Studies in Air Transportation & Traffic Eng. / Industrial Eng. /Mathematics etc. ,
- Motivation and ability to work independently and collaboratively,
- Programming skills (preferably MATLAB or Python),
- Knowledge sharing and Reporting abilities,
- High working knowledge of English.

Beneficiary points:

- Record of published papers,
- Good academic records,
- Background in ATM,

Deadline: *until position filled*

Duration: *Maximum 6 months*

Contact: (Please quote 'ATFMRES5.2' on all correspondence)

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