

## **Master Thesis Proposal**

### Online Estimation of Power System Inertia

#### **Context:**

The incessant increase of the number of converter-interfaced renewable generation is transforming power systems into large-scale low inertia networks and hence is jeopardizing the stability of future power. Moreover, due to the presence of renewable energy sources the system inertia is no longer a constant like in conventional systems. Consequently, the knowledge of inertia in real time helps in the assessment of the state of health and would allow system operators to take appropriate actions and quantify how much additional inertia is needed to secure the system operation.

Conventional inertia estimation methods are based on analysis of frequency measurements during a known disturbance to the system. However, these methods base on post-mortem analysis, do not allow the system operator to take preventive measures to ensure the stability of the system. On the other hand, system identification methods can be used to estimate the inertia of the system from ambient measurements and not only during disturbances.

This thesis focuses on the development of online inertia estimation method using system identification.

#### **Your Tasks:**

- Literature review of online inertia estimation methods.
- Literature review of existing system identification methods.
- Development/Implementation of online inertia estimation concept based on system identification methods and testing the estimation method in Matlab/Simulink.

#### **Your Profile:**

- Student of Electrical Engineering at RWTH Aachen University
- Fundamental knowledge about power system dynamics and control theory.
- Matlab/Simulink and Python are prerequisite skills.

For further information, please contact:

**Diala Nouti**

Tel. +49 241 80 49581

[dnouti@eonerc.rwth-aachen.de](mailto:dnouti@eonerc.rwth-aachen.de)

ACS | Institute for Automation of Complex  
Power Systems

ERC | E.ON Energy Research Center  
RWTH Aachen University

Mathieustr. 30, 52074 Aachen, Germany