



University of Stuttgart
Germany

Institute of Combustion and Power Plant Technology
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Announcement

Master Thesis

Learning to run a power system using reinforcement learning algorithms

Background

Power networks transport electricity across states, countries and even continents. They are the backbone of power distribution, playing a central economical and societal role by supplying reliable power to industry, services, and consumers. Their importance appears even more critical today as we transition towards a more sustainable world within a carbon-free economy, and concentrate energy distribution in the form of electricity. Problems that arise within the power grid range from transient brownouts to complete electrical blackouts which can create significant economic and social perturbations. Grid operators are still responsible for ensuring that a reliable supply of electricity is provided everywhere, at all times. With the advent of renewable energy, electric mobility, and limitations placed on engaging in new grid infrastructure projects, the task of controlling existing grids is becoming increasingly difficult.

Objective

Within this work the student will have the opportunity to tackle a challenging real-world problem by developing reinforcement learning (RL) algorithms in order to control the electricity transport in power networks running closer to their operational limits while keeping people and equipment safe. This master thesis can be also part of the NeurIPS2020 challenge entitled "L2RPN: Learning to Run a Power Network in a Sustainable World". The thesis can be written either in German or English.

Approach and tasks

1. Literature review
2. Development of an RL agent
3. Integration of the RL agent in a power system simulation environment
4. Evaluation of the results

Requirements

- Working independently
- Knowledge of machine learning is a must
- Linear algebra
- Python

Start date: *immediately!*

Interested students please contact

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