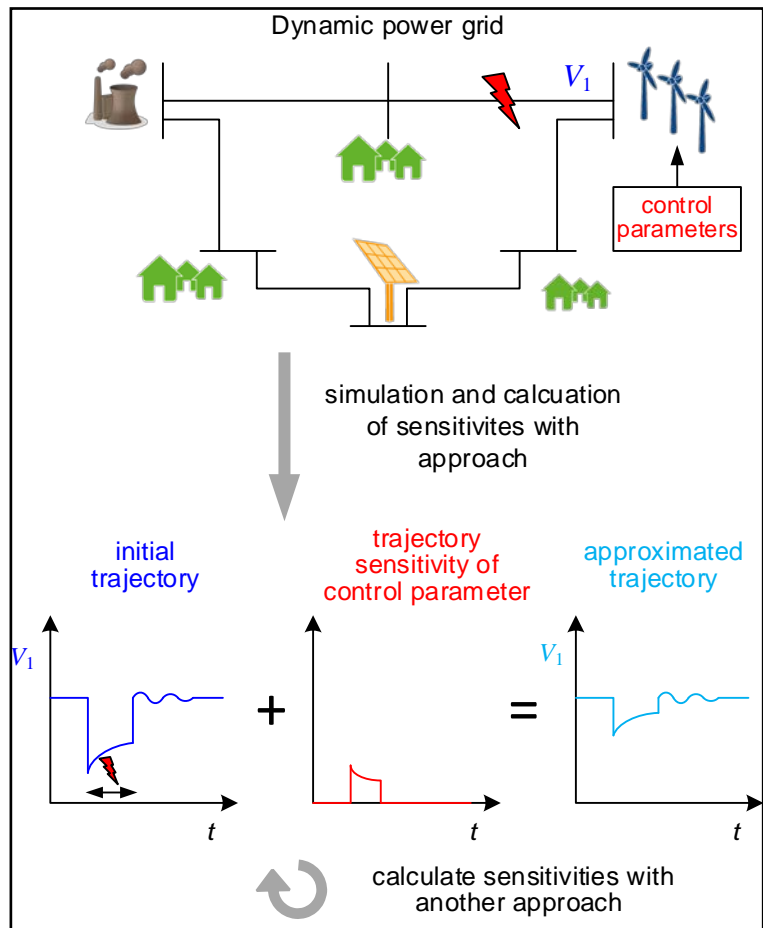


Comparison of trajectory sensitivity approaches for parameter tuning

Due to the energy transition, a shift from conventional generation (e.g. coal, nuclear power) to renewable generation (e.g. PV, wind power) is taking place. To ensure the stability of this new system, dynamic simulations have to be carried out, e.g. to find suitable control parameters (e.g. of a wind farm). Due to the complexity of such a system, parameter tuning is often achieved by a trial-and-error approach with high computational costs. Therefore, in this thesis, the so-called trajectory sensitivity shall be applied for quicker and target-oriented parameter tuning. In general, the trajectory sensitivity reflects the influence of a parameter on a state (e.g. voltage) over time (see figure). They can be calculated with little or no extra effort alongside the dynamic simulation. As there exist different approaches to calculate these sensitivities, this thesis shall analyse their differences and similarities.

Thesis structure :

- Literature research on trajectory sensitivity
- familiarization with the programming language Julia
- Implementation of an interface to a sensitivity package (SciMLSensitivity.jl)
- demonstration of the interface based on an existing power grid
- control parameter tuning of a renewable generator based on trajectory sensitivities



The thesis is aimed at electrical engineering & information technology or industrial engineering. The thesis can be written either in **English or German**.

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