Grid inertia estimation: Critique on existing inertia estimation techniques

In the context of increasing integration of inverter-based renewable energy sources into the power system, the reduction of the system's inertia leads to frequency fluctuations. Accurate estimation of power system inertia becomes crucial for planning appropriate power generation reserves to address the intermittency of these renewable sources. The traditional swing-equation-based techniques for inertia estimation rely on a simplified first-order power system model based on small-signal stability, assuming that inverters follow the droop and swing-equation equivalence.

However, as renewable penetration increases, the power system's behavior deviates from the conventional swing-equation model. **This thesis investigates the accuracy of traditional swing-equation-based inertia estimation techniques under high renewable penetration. Various simulation scenarios will be conducted with varying levels of renewable integration, and an ARMAX system identification technique will be employed to extract grid inertia.**

Requirements:

1. Background in Electrical Engineering.
2. Knowledge of DigSilent PowerFactory.
3. Willingness to learn and team player.

If you are interested in this topic or have any questions regarding the subject matter, please don't hesitate to reach out.

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