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Vortragsankündigung

Seminar Regelungssysteme LV 0430L 654

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Vortragsort: EN 223

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Virtual Inertia: Concept, Applications and Achievements -- Part I

The Microgrid (MG) concept as an important block of future smart grids provides a quite appealing solution for integrating renewable energy sources (RESs) into power grids. Recent investigations indicate that relatively high integration of inverter-based distributed generators (DGs) and RESs will have some negative impacts on MG dynamics, performance and stability. These impacts may increase at the expected penetration rates over next several years. An important source of these impacts is the reduction of the overall inertia. Compared to conventional power grids with bulk power plants, MGs with DG/RES units have either small or no rotating mass and damping property. A solution toward stabilizing a grid/MG with numerous low-inertia DGs is to fortify the system with additional inertia, virtually. Virtual inertia (VI) can be established by using short-term energy storage together with a power electronics converter and a proper control mechanism in a system known as virtual synchronous generator (VSG). The VSGs exhibit amount of inertia and damping properties of conventional synchronous machines for short time intervals. As a result, the VI concept may provide a basis for maintaining a large share of DGs/RESs in future grids without compromising the system performance and stability. The lecture describes the most important issues on VI as well as new relevant perspectives and research outcomes.