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SPECIAL SESSION IX

Impact of topology and soil properties on grounding systems performance: modelling and simulation of transients

ORGANIZED AND CHAIRED BY

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Safety of power systems at different voltage levels and limitation of external overvoltages strongly rely on grounding, as a fundamental, yet simple, solution adopted by worldwide engineers and utilities. Nevertheless, to the simple concept underlying its application, there are corresponding complexities in the real practice. Indeed, depending on the grounding system topology and dimension, and on the magnetic and electric properties of the soil, the ground impedance may be only poorly approximated to a constant-valued quantity. Advanced simulation methods and modelling approaches turn necessary to account for frequency dependent soil properties, frequency response of the grounding system, and nonlinearities when soil ionization occurs.

Studies of fast transients within power networks, including the effects of lightning impulse currents, should not neglect these important aspects of the grounding actual physics.

Spread of renewable energy power plants made the topic of impulse response of wind turbines' grounding systems gain increasing interest, also due to the relevant number of observed lightning strikes to the blades.

Interconnection of grounding systems is also being adopted as a method to reduce the low frequency ground resistance. However, the effectiveness of the measure should be considered also with respect to the impulse response of the connected earthing system.

Topics of interest include, but are not limited to:

- **Modelling approaches and equivalent circuits for grounding systems;**
- **Measuring ground resistance and impulse impedance;**
- **Impact of soil characteristics and soil ionization;**
- **Grounding in renewable energy power plants;**
- **Role of the ground impedance in transients' studies and protection coordination;**
- **Innovative grounding configurations and topologies;**
- **Interaction between grounding systems;**
- **Simplified approaches for the computation of ground impedances of complex systems;**
- **Case studies**

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