

Power System Modeling for Calculations in Frequency and Steady State Domain

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Abstract : Application of new technological solutions and installation of new elements into the network requires special attention when investigating its interaction with the existing power system. Special attention needs to be devoted to the occurrence of harmonic resonance. Sources of increasing harmonic penetration could be wind power plants, Flexible Alternating Current Transmission System (FACTS) devices, underground and submarine cable installations etc. Calculation in frequency domain with various software, for example, the software for power systems transients EMTP-RV presents one of the most common ways to obtain the harmonic impedance of the system. Along calculations in frequency domain, such software allows performing of different type of calculations as well as steady-state domain. This paper describes a power system modeling with software EMTP-RV based on data from SCADA/EMS system. The power flow results on 220 kV and 400 kV voltage levels retrieved from EMTP-RV are verified by comparing with power flow results from power transmissions system planning software PSS/E. The determination of the harmonic impedance for the case of remote power plant connection with cable up to 2500 Hz is presented as an example of calculations in frequency domain.

Keywords : power system modeling, frequency domain, steady state, EMTP-RV, PSS/E

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