Real-time remedial action against aperiodic small signal rotor angle instability - DTU Orbit (08/11/2017)

Real-time remedial action against aperiodic small signal rotor angle instability

This paper presents a method that in real-time determines remedial actions, which restore stable operation with respect to aperiodic small signal rotor angle stability (ASSRAS) when insecure or unstable operation has been detected. An ASSRAS assessment method is used to monitor the stability boundary for each generator in real-time. The ASSRAS boundary represents the condition when a generator reaches the maximum steady state active power injection. The proposed control method exploits analytically derived expressions for the ASSRAS boundary and other characteristic curves in the injection impedance plane to determine an active power redispatch among selected generators to restore stable and secure operation. Since the method is purely based on analytically derived expression, the computation of the remedial actions is fast and well suited for real-time operation. The method was tested on the IEEE 14-bus and the Nordic32 test systems where results show that the method can efficiently determine the required active power redispatch to avoid an imminent instability.

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Authors: Weckesser, J. T. G. (Intern), Jóhannsson, H. (Intern), Østergaard, J. (Intern)
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