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Comparing the methods of defining the synchronizing power of a synchronous machine based on the results of physical simulation involving the electrodynamic model operated by the STC UPS.

To estimate the synchronous generator capability to maintain synchronous operation under deviating frequency and load angle conditions synchronizing torque and corresponding synchronizing power are proposed to be used. The possibility to determine the synchronous machine synchronizing power is subject to the presence of the load angle variation data while the primary barrier is the absence of the corresponding direct measurements. The techniques have been developed previously for deriving the synchronous machine load angle without direct measurement using the electrical parameters measurements. The paper presents the techniques validation involving numerous physical simulations in order to estimate the effect of the assumptions made. Major efforts have been aimed at developing and implementing the generator load angle direct measurement system. The system has become the part of the electrodynamic model operated by the STC UPS with the resulting opportunity to compare the estimated and directly measured load angle values taking into account the nonlinear characteristics of the actual machine.

Key-words: low-frequency oscillations, phasor measurements, synchronous machine, load angle, synchronizing power, electrodynamic model.

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