

**Abstract:**

The operational security of the power system depends on the successful function of thousands of relays that may be used in protective scheme. The failure of one relay of the protective scheme to operate as intended may jeopardize the stability of the entire power grid and hence may lead to blackout. In fact, major power system failures during transient disturbances are more likely to be caused by unnecessary protective relay tripping rather than by the failure of a relay to take action. In other words, the performance of protective relay or system is very important to be well known. Appropriate relay testing provides a first defense against relay mal-operations and hence improves power grid stability and prevents catastrophic bulk power system failures. In this work, new technologies that allow designing an enhanced relay testing system that can be used for improving the performance of protective relay have been used. A new PC based tester framework using acquisition card for generating transient disturbances such as power swing is proposed. In the present work, the signals have been generated by Simulink/MATLAB simulator under different conditions and outputted to external environment via AD622 board. The generated signals displayed on the scope are satisfactory.