

## **Generic model of active distribution network for large power system stability studies**

### **Abstract**

This paper presents the development of the dynamic equivalent model of an active distributed network (ADN) based on the grey-box approach. The equivalent model of an ADN comprises a converter-connected generator and a composite load model in parallel. The grey-box approach was chosen for model development as it incorporates prior knowledge about the ADN structure into the model, makes the model more physically relevant and intuitive than black-box or white-box models, and potentially improves the accuracy of the model. The dynamic equivalent model is presented in the seventh-order nonlinear state space format. It was initially loosely developed from the algebraic and differential equations describing assumed typical components of an ADN. Various static load models, dynamic load compositions, fault locations and a diverse range of distributed generation types and scenarios are considered in order to establish the generic range of model parameters for an ADN. The model is intended for the use in large power system stability studies.

### **Keywords**

Active distribution network; Dynamic equivalent; Grey-box; Nonlinear least square optimization; Power distribution engineering