

DYNAMIC EQUIVALENTS OF DISTRIBUTION FEEDERS WITH DISPERSED WIND TURBINES FOR FAULT CURRENT ESTIMATION

Fotis Kanellos, Nikos Hatziargyriou
Department of Electrical and Computer Engineering
National Technical University of Athens
Iroon Politechniou 9, 15773 Athens, Greece
Phone (30) 210/7485-587, Fax (30) 210/7723-659
E-mail: kanellos@power.ece.ntua.gr, kanellos@mail.ntua.gr

Keywords: fault current estimation, dispersed generation, modelling, wind turbines, identification, equivalent models, model order reduction

ABSTRACT

In this paper reduced order state space models for Wind Turbines (WTs) equipped with asynchronous generators are derived, using system identification theory. Simple linear difference equations are used for the derivation of the equivalent models. System non-linearity is overcome by using an arbitrary non-linear transformation of WT's model inputs. Application of reduction order techniques provides significantly simpler state-space models, which are subsequently combined with the equations representing a distribution network producing a reduced order equivalent model. The obtained reduced order equivalent model is used for symmetrical three-phase fault-current prediction. Simulation results confirm the accuracy and the advantages of the obtained equivalent model.