

RESEARCH OF INTERCONNECTED WIND TURBINES WITH INTELLIGENT CONTROL

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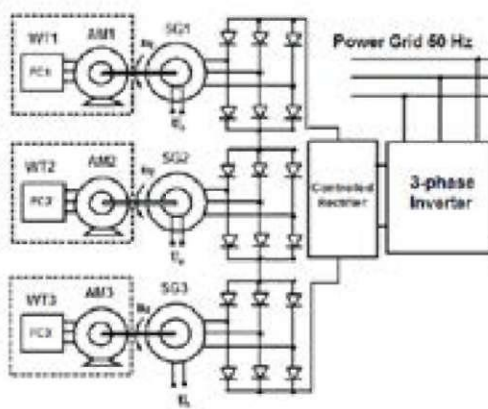
Introduction. Development of renewable energy sources in Kazakhstan, including wind energy, brings the needs to design and develop control and integration to a power system. The aim of the Project is to design a power converter supplied by intelligent controllers that provide a stable 3-phase output voltage in the presence of uncertain fluctuations of a wind speed.

Methodology. Control systems are designed and simulated on the basis of the following approaches and methods:

- Additional equilibria control with genetic algorithm for parameter adjustment [1].
- Model-referenced adaptive control of output voltage using the voltage feedback [2].
- Model-referenced adaptive control of output voltage using the current feedback [3].

Design and Implementation. 7,5 kW experimental facility for simulation of interconnected wind turbines control is implemented and installed at NURIS. Under 3 synchronized generators connected in series the controlled converters provide DC 540V for further grid connected mode and 3-phase AC 380V for autonomous mode.

Results. Designed model of control systems are discussed in the IEEE conferences. Newly structured DC-AC three-phase inverter is applied for the Eurasian patent.



References.

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3. Ten V., Sharipova D. Nikulin V. Approach to control of hybrid renewable power system on the basis of adaptive control with local parametric optimization. // Proceedings of the 3rd International Conference on Renewable Energy Research and Applications (ICRERA 2014), October 19-22, 2014, in Milwaukee WI, USA. - 2014.