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Superconducting Magnetic Energy Storage for improving the performance of Wind Energy conversion systems

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Content :

Superconductivity has found several exciting applications in storing energy and transferring power. Recently, generation of electricity using wind power has received considerable attention all over the world. One of the simplest methods of running a wind generation system is to use an induction generator connected directly to the power grid. Induction generators are the most cost-effective and robust machines for energy conversion. However, induction generators have some stability problems. When a wind generator is connected to the grid associated with a local load, the variations of wind speed disturbs the stability of the system. It also injects harmonics into the power system. By connecting an SMES with wind generator it is possible to stabilize the power to the load even in the presence of wide variations in the wind speed. The present paper describes the application of SMES in wind power systems along with control strategies to deal with the transient stability enhancement, damping, and voltage sag and swell conditions so that a quality power can be obtained from off-shore wind power generating arrays.

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