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Particle swarm optimization based sliding mode control of variable speed wind energy conversion system

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Abstract: This paper proposes a particle swarm optimization based sliding mode control of squirrel cage induction generator of a variable speed wind energy conversion system. The key feature of sliding mode control is a wisely chosen sliding surface which allows the turbine to operate more or less close to the optimal regimes characteristic. Optimal control parameters which are the convergence speed to the sliding-mode, the slope of the surface and the switching component amplitude of SMC are determined using particle swarm optimization approach. The simulation results prove the viability of the proposed control structure.

Keywords : Squirrel Cage Induction Generator (SCIG), Wind Energy Conversion System (WECS), Sliding Mode Control (SMC), Particle Swarm Optimization (PSO)