

| | |
|-------------------------|---|
| 1. Record Nr. | UNINA9910830068903321 |
| Autore | Bouزيد Monia Ben Khader |
| Titolo | Electrical and Mechanical Fault Diagnosis in Wind Energy Conversion Systems |
| Pubbl/distr/stampa | Newark : , : John Wiley & Sons, Incorporated, , 2023 ©2024 |
| ISBN | 1-394-23644-1 1-394-23642-5 |
| Edizione | [1st ed.] |
| Descrizione fisica | 1 online resource (226 pages) |
| Altri autori (Persone) | ChampenoisGérard |
| Lingua di pubblicazione | Inglese |
| Formato | Materiale a stampa |
| Livello bibliografico | Monografia |
| Nota di contenuto | Cover -- Title Page -- Copyright Page -- Contents -- Introduction -- Chapter 1. Accurate Electrical Fault Detection in the Permanent Magnet Synchronous Generator and in the Diode Bridge Rectifier of a Wind Energy Conversion System -- 1.1. Introduction -- 1.2. Description of the system under study and the used fault detection method -- 1.3. Fundamental notions of the symmetrical components -- 1.4. Development of the analytical expressions of the NSV in the case of the different considered faults -- 1.4.1. Analytical expression of 2 V in the case of simultaneous faults -- 1.4.2. Analytical expression of 2 V in the case of ITSCF in the PMSG -- 1.4.3. Analytical expression of 2 V in the case of OCDF in the rectifier -- 1.5. Analytical study of the indicators of the different faults -- 1.5.1. Analytical study in the case of ITSCF -- 1.5.2. Analytical study in the case of OCDF in the rectifier -- 1.5.3. Analytical study in the case of SF -- 1.6. Experimental validation of the proposed fault indicators -- 1.6.1. Description of the tests process -- 1.6.2. Experimental results in the case of healthy operation -- 1.6.3. Experimental results in the case of ITSCF in the PMSG -- 1.6.4. Experimental results in the case of an OCDF fault in the rectifier -- 1.6.5. Experimental results in the case of SF in the system considered -- 1.7. Description of the method proposed -- 1.8. Conclusion -- 1.9. References -- Chapter 2. Control and Diagnosis of Faults in Multiphase Permanent Magnet Synchronous Generators for High-Power Wind |

Turbines -- 2.1. Introduction -- 2.2. Wind energy conversion systems -- 2.3. Multiphase electric drives on WECS -- 2.4. Model of a six-phase PMSG drive -- 2.4.1. Natural reference frame -- 2.4.2. Synchronous reference frame -- 2.5. Control strategies -- 2.5.1. Introduction -- 2.5.2. Field-oriented control -- 2.5.3. Direct torque control. 2.5.4. Finite control set model predictive control -- 2.6. Fault diagnosis in multiphase drives -- 2.6.1. Introduction -- 2.6.2. Interturn short-circuit faults -- 2.6.3. High-resistance connections and open-phase faults -- 2.6.4. Permanent magnet faults -- 2.6.5. Current sensor faults -- 2.6.6. Speed sensor faults -- 2.7. Conclusion -- 2.8. References -- Chapter 3. Gearbox Fault Monitoring Using Induction Machine Electrical Signals -- 3.1. Introduction -- 3.2. Motor stator current signature approach -- 3.2.1. Air gap magnetic flux density-based approach -- 3.2.2. Magnetizing current approach -- 3.3. Wound rotor current signature approach -- 3.4. Experimental results -- 3.4.1. MCSA for geared motor fault diagnosis -- 3.4.2. MCSA for WT gearbox -- 3.4.3. WT generator current processing -- 3.4.4. Current transformations for geared motor fault diagnosis -- 3.5. Conclusion -- 3.6. Acknowledgments -- 3.7. References -- Chapter 4. Control of a Wind Distributed Generator for Auxiliary Services Under Grid Faults -- 4.1. Introduction -- 4.2. Description of the renewable distributed generator -- 4.3. Control of the distributed generator -- 4.3.1. Control of the wind generator -- 4.3.2. Control of the hybrid storage system -- 4.3.3. Control of the DC bus voltage -- 4.4. Power management algorithm -- 4.4.1. Specifications -- 4.4.2. Determination of inputs/outputs -- 4.4.3. Determination of membership functions -- 4.4.4. Inference engine for energy management -- 4.5. Detection and control of the grid faults -- 4.5.1. Fuzzy logic islanding detection -- 4.5.2. Fuzzy droop control technique for the adjustment of the grid frequency and voltage -- 4.6. Simulation results -- 4.6.1. Control and power management of the distributed generator -- 4.6.2. Detection and correction of the grid voltage and frequency variations at the PCC -- 4.7. Conclusion -- 4.8. References.

Chapter 5. Fault-Tolerant Control of Sensors and Actuators Applied to Wind Energy Systems -- 5.1. Introduction -- 5.2. Objective -- 5.3. RFFTC of WES with DFIG -- 5.3.1. TS fuzzy model with parameter uncertainties and fuzzy observer -- 5.3.2. Proposed RFFTC based on FPIEO and FDOS -- 5.3.3. Proposed RFFTC stability and robustness analysis -- 5.3.4. WES with DFIG application -- 5.3.5. Simulations and results -- 5.4. RFSFTC of WES with DFIG subject to sensor and actuator faults -- 5.4.1. TS fuzzy plant model with actuator faults, sensor faults and parameter uncertainties -- 5.4.2. Proposed RFSFTC algorithm based on FPIEO and FDOS -- 5.4.3. Derivation of the stability and robustness conditions -- 5.4.4. WES with DFIG application and simulations and results -- 5.5. RDFFTC of hybrid wind-diesel storage system subject to actuator and sensor faults -- 5.5.1. Fuzzy observer scheme for the uncertain system with sensor and actuator faults -- 5.5.2. Proposed RDFFTC, reference model and stability analysis -- 5.5.3. HWDSS application and simulations and results -- 5.6. Conclusion -- 5.7. References -- List of Authors -- Index -- EULA.
