|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | **CONTENTS** | |  | | | | |
| **Chapter**  **Particulars** |  | | **Page**  **No** | | | | |
|  | **LIST OF ABBREVATIONS** | | **I-II** | | | | |
|  | **LIST OF FIGURES** | | **III-IV** | | | | |
| **CHAPTER-1** | **INTRODUCTION** | | **1** | | | | |
|  | 1.1 Introduction | | 1 | | | | |
|  | 1.2 Literature Survey | | 4 | | | | |
|  | 1.3 Problem Formation | | 8 | | | | |
|  | 1.4 Objective Of The Project | | 8 | | | | |
|  | 1.5 Organization Of Project | | 9 | | | | |
| **CHAPTER-2** | **SYSTEM CONFIGURATION** | | **10** | | | | |
|  | 2.1 Introduction | | 10 | | | | |
|  | 2.1 Distributed Generation | | 10 | | | | |
|  | 2.11 Cogeneration | | 12 | | | | |
|  | 2.12 Solar power | | 13 | | | | |
|  | 2.13 Wind power | | 13 | | | | |
|  | 2.14 Hydro power | | 14 | | | | |
|  | 2.15 Waste-to-energy | | 14 | | | | |
|  | 2.16 Energy storage | | 14 | | | | |
|  | 2.16.1 Grid energy storage | | 14 | | | | |
|  | 2.16.2 PV storage | | 15 | | | | |
|  | 2.16.3 Vehicle-to-grid | | 15 | | | | |
|  | 2.16.4 Flywheels | | 15 | | | | |
|  | 2.2 Total Harmonic Distortion | | 15 | | | | |
|  | 2.21 Definitions and examples | | 16 | | | | |
|  | 2.22 Measurement | | 18 | | | | |
|  |  | |  | | | | |
|  | | 2.3 Phase locked loop (PLL) | | | 19 | |
|  | | 2.3.1 Phase Detector | | | 19 | |
|  | | 2.3.2 Exclusive OR Phase Detector | | | 20 | |
|  | | 2.3.3 Exclusive-OR Phase Detector | | | 20 | |
|  | | 2.3.4 Edge Triggered Phase Detector | | | 21 | |
|  | | 2.3.5 Monolithic Phase Detectors | | | 21 | |
|  | | 2.3.6 Low Pass Filter (LPF) | | | 21 | |
|  | | 2.3.7 Voltage Controlled Oscillator(VCO) | | | 21 | |
|  | | 2.3.8 PLL working | | | 22 | |
|  | | 2.4 EKF | | | 24 | |
|  | | 2.5 Boost Converter | | | 25 | |
|  | | 2.6 Solar power generation | | | 27 | |
|  | | 2.6.1 Principles of Solar Electricity | | | 27 | |
|  | | 2.6.2 Application of Solar Electricity | | | 28 | |
|  | | 2.6.3 Stand Alone or Off Grid Solar Power Station | | | 29 | |
|  | | 2.6.4 Grid Tie Solar Power Station | | | 30 | |
|  | | 2.6.5 Grid Tie with Power Backup Solar Power Generation | | | 32 | |
|  | | 2.6.6 Grid Fallback Solar Power Generation | | | 32 | |
|  | | 2.7 System configuration | | | 33 | |
| **CHAPTER-3** | | **CONTROL APPROACH** | | | **35** | |
|  | | A. EKF Scheme for Load Currents | | | 35 | |
|  | Processing | | |  | |
|  | B. Assigning Load Current Weights | | | 39 | |
|  | C. DC Link Voltage Regulation and PV  Feed-Forward Compensation | | | 40 | |
|  | D. Fault Ride-Through Control | | | 41 | |
|  | E. Generation of Inverter Gating Pulses | | | 44 | |
| **CHAPTER-4** | **FUZZY LOGIC CONTROLLER** | | | **46** | |
|  | 4.1. Fuzzy Logic System | | | 46 | |
|  | 4.2. Fuzzy Logic Basic Operations | | | 47 | |
|  | 4.3. Fuzzification Method | | | 48 | |
|  | 4.4. Rule Matrix | | | 49 | |
|  | 4.5. Inference Mechanisms | | | 50 | |
|  | 4.6. Defuzzification Mechanisms | | | 51 | |
| **CHAPTER-5** | **SIMULATION RESULTS** | | | **53** | |
|  | 1. Simulation results using pi controller | | | 53 | |
|  | 1. Simulation results using anfis controller | | | 57 | |
|  | **CONCLUSION** | | | **60** | |
|  | **REFERENCES** | | | **61** | |