

Simulation, Optimization, and Analysis Approach of Microgrid Systems

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Abstract : Sources are classified into two depending upon the factor of reviving. These sources, which cannot be revived into their original shape once they are consumed, are considered as nonrenewable energy resources, i.e., (coal, fuel) Moreover, those energy resources which are revivable to the original condition even after being consumed are known as renewable energy resources, i.e., (wind, solar, hydel) Renewable energy is a cost-effective way to generate clean and green electrical energy Now a day's majority of the countries are paying heed to energy generation from RES Pakistan is mostly relying on conventional energy resources which are mostly nonrenewable in nature coal, fuel is one of the major resources, and with the advent of time their prices are increasing on the other hand RES have great potential in the country with the deployment of RES greater reliability and an effective power system can be obtained In this thesis, a similar concept is being used and a hybrid power system is proposed which is composed of intermixing of renewable and nonrenewable sources The Source side is composed of solar, wind, fuel cells which will be used in an optimal manner to serve load The goal is to provide an economical, reliable, uninterruptable power supply. This is achieved by optimal controller (PI, PD, PID, FOPID) Optimization techniques are applied to the controllers to achieve the desired results. Advanced algorithms (Particle swarm optimization, Flower Pollination Algorithm) will be used to extract the desired output from the controller Detailed comparison in the form of tables and results will be provided, which will highlight the efficiency of the proposed system.

Keywords : distributed generation, demand-side management, hybrid power system, micro grid, renewable energy resources, supply-side management

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