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Optimal economic dispatch in Microgrids with Renewable Energy sources

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Currently, the opening of the energy sector yields a new form of competition and changes of paradigms in the pattern of electricity generation. Then, distributed generation has attracted a great interest for energy contribution in the whole generation of electric power. Today, the concept of microgrids emerges as a natural alternative to the conventional electric power systems, where big synchronous generators in remote sites could be accompanied with smaller generators and shorter transmission lines near to the loads, which provide an effective and sustainable alternative for the integral use of renewable energies. Generation units in microgrids can be conventional generators in the case of thermal generators or diesel engines, in the same way, Renewable Energy Sources (RES) can be included as wind turbines, photovoltaic systems, fuel cells or Battery Energy Storage Systems (BESS). These new technologies offer a feasible electric power system, but its operation

is conditioned to consider the particularities and nature of each generation system, combined to the stochastic profile of the primary energy.

It is very important to consider in RES projects that their operation is subject to randomness and interruptions, which makes difficult to find the best dynamic solution in an economic dispatch problem. Thus, the energy management in microgrids seeks to optimize some desired objective function, that defines the cost behavior, reliability and efficiency of the system, as well as the determination of the optimal energy dispatch (economic dispatch), within physical restrictions of conventional and emerge generation systems. Thereby, RES and BESS could meet with complex tasks of interconnection to large power systems, or as a technical alternative to the management of excess/deficiency of generated energy in smaller grids, considering the load variations.

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