Fuzzy Adaptive Control of an Intelligent Hybrid HPS (Pvwindbat), Grid Power System Applied to a Dwelling

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Abstract : Nowadays the use of different sources of renewable energy for the production of electricity is the concern of everyone, as, even impersonal domestic use of the electricity in isolated sites or in town. As the conventional sources of energy are shrinking, a need has arisen to look for alternative sources of energy with more emphasis on its optimal use. This paper presents design of a sustainable Hybrid Power System (PV-Wind-Storage) assisted by grid as supplementary sources applied to case study residential house, to meet its entire energy demand. A Fuzzy control system model has been developed to optimize and control flow of power from these sources. This energy requirement is mainly fulfilled from PV and Wind energy stored in batteries module for critical load of a residential house and supplemented by grid for base and peak load. The system has been developed for maximum daily households load energy of 3kWh and can be scaled to any higher value as per requirement of individual /community house ranging from 3kWh/day to 10kWh/day, as per the requirement. The simulation work, using intelligent energy management, has resulted in an optimal yield leading to average reduction in cost of electricity by 50% per day.

Keywords : photovoltaic (PV), wind turbine, battery, microcontroller, fuzzy control (FC), Matlab

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