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Optimization of Stable Election Protocol through Genetic Algorithm & Particle Swarm Optimization in clustered wireless sensor network

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Abstract — **we study the impact of heterogeneity of nodes, in terms of their energy, in wireless sensor networks that are hierarchically clustered. In these networks some of the nodes become cluster heads, aggregate the data of their cluster members and transmit it to the sink. We assume that a percentage of the population of sensor nodes is equipped with additional energy resources—this is a source of heterogeneity which may result from the initial setting or as the operation of the network evolves.**
Classical clustering protocols assume that all the nodes are equipped with the same amount of energy and as a result, they cannot take full advantage of the presence of node heterogeneity. We studied SEP, a heterogeneous-aware protocol to prolong the time interval before the death of the first node (we refer to as stability period), which is crucial for many applications where the feedback from the sensor network must be reliable.
also the final Optimization of SEP protocol is done through Genetic Algorithm and Particle Swarm Optimization, and found that PSO on SEP yields longer stability region for higher values of extra energy brought by more powerful nodes as Compare to SEP and SEP-GA..

Keywords — **LEACH, Stable Election Protocol, Particle Swarm Optimization, Genetic Algorithm.**