Abstract-- In-network data aggregation plays an important role on energy consumption from the point of reducing the amount of communication in cluster-based wireless sensor networks. The selection of cluster heads is usually based on two criteria which are the number of cluster heads network needed and the times of every node serving as the cluster head. Too much or too little cluster head number will shorten the network lifetime for the energy premature depletion of some sensor nodes, so it has a great significance to select the optimal cluster heads number for wireless sensor networks. Based on the information rate-distortion function and network energy model, we propose an algorithm OCHN which calculates the optimal cluster head number for the minimal energy consumption, and further gets the optimal cluster head ratio in the process of data aggregation. Simulation results demonstrate that our proposed algorithm is energy efficient, and the comprehensive performances of network lifetime and data transmission are good for data aggregation in wireless sensor network.

Index terms: wireless sensor networks, data aggregation, cluster head number, information entropy.