

## 一种能量有效的WSN目标跟踪动态协同自组织算法

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摘要：

针对无线传感器网络目标跟踪应用中跟踪精度与网络能耗的权衡问题，提出一种能量有效的动态协同自组织算法（E-DCS）。根据目标预测位置和节点的位置、能量信息，建立了信息效用、通信开销和节点剩余能量的综合性能指标，并利用层次分析法确定了性能指标中各要素的权值系数。通过自适应动态成簇策略，分别设定簇首切换精度阈值和节点选择精度阈值判断是否切换簇首和选择任务节点。簇首节点根据簇内节点提供的测量信息采用序贯EKF进行状态估计。仿真结果表明，与信息驱动传感器查询（IDSQ）和自适应动态协同自组织算法（A-DCS）相比，该算法在保证跟踪精度的基础上，降低了网络能耗，有效延长了网络的生命周期。

关键词：无线传感器网络；能量有效；协同自组织；目标跟踪；动态成簇

## An Energy-efficient Dynamic Collaborative Self-organizing Algorithm for Target Tracking in Wireless Sensor Networks

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**Abstract:**

Aiming at the tradeoff between tracking accuracy and energy consumption for target tracking in wireless sensor networks, a kind of energy-efficient dynamic collaborative self-organizing algorithm (E-DCS) is proposed, in which the comprehensive performance index is established based on the information utility, communication overhead and the residual energy of the nodes. And the AHP is adopted to determine the weight coefficients of the elements within performance index. In order to judge whether to switch the cluster head and select task nodes, this adaptive dynamic clustering strategy set the switching accuracy threshold of cluster head and the node selection accuracy threshold respectively. Cluster head uses the sequential EKF for state estimation according to the measurements provided by the nodes in the cluster. Compared with information driving sensor query (IDSQ) and adaptively dynamic collaborative self-organizing algorithm (A-DCS), the proposed algorithm can reduce the energy consumption and prolong the life time of the network while meeting the precision requirement.

**Keywords:** wireless sensor networks; energy-efficient; collaborative self-organizing; target tracking; dynamic clustering

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