**Energy Efficient Resource Allocation in Wireless Energy Harvesting Sensor Networks**

**Abstract:**

Extending the sensor life time is one of the most important issues in widespread use of Wireless Sensor Networks (WSNs). The Energy Harvesting (EH) sensors have been proposed to overcome the mentioned problem in recent years. These sensors can harvest their required energy from environment in different methods, resulting in longer life time. We consider a TDMA based Wireless Energy Harvesting Sensor Network (WEHSN) in which the time slot consists of two-time intervals; the first one is utilized to absorb energy whereas the second one is used to transmit the sensors’ data. We investigate the energy efficient resource allocation in WEHSN with constraints on time scheduling parameters and transmission power consumption, where an EH sensor is allowed to transmit its data if the amount of its harvested energy is more than the consumption power. We derive the closed form expression for the optimization problem, corresponding to the energy efficiency and convert it to a parametric form, using Dinkelbach method. Then, we solve the new problem using Karush-Kuhn-Tucker (KKT) conditions. The numerical results shows the effectiveness of the proposed method.

**Literature Review:**

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| **S. NO** | **Journal Type with year** | **Authors** | **Title** | **Outcomes** |
| 1 | IEEE Communications Magazine (2017) | J. Huang, C. Xing, and C. Wang | Simultaneous wireless information and power transfer: Technologies, applications, and research challenge | Conducted a study on SWIPT technologies and challenges in implementing it. |
| 2 | IEEE Access, (2018) | K. Kang, R. Ye, Z. Pan, J. Liu, and S. Shimamoto, | Full-duplex wireless powered IOT networks | Maximize the total surplus energy which is the gap between available energy and consumed energy |
| 3 | IEEE Internet of Things Journal (2018) | Z. Chu, F. Zhou, Z. Zhu, R. Q. Hu, and P. Xiao | Wireless powered sensor networks for internet of things: Maximum throughput and optimal power allocation | Proposed a quadratic energy trading based Stackelberg game, linear energy trading based Stackelberg game for better validation purpose. |

**Existing Method:**

* Consider a WEHSN, which consists of one Hybrid Access Point (HAP) plugged to an infinite power supply and M sensors capable of energy harvesting.
* At first, sensors harvest energy in downlink (DL) from a Wireless Energy Transferring (WET), then, they transmit information in uplink (UL) towards a Wireless Information Transmission (WIT). The total time interval for energy harvesting and information transmission is denoted by Tmax.
* During DL WET and transmit information in duration of UL WIT. The second interval is divided into M slots belonging to each sensor. The perfect Channel State Information (CSI) is assumed to be available in each sensor for resource allocation.

**Disadvantage:**

* Throughput is very low and it is not required to send data effectively.

**Extension:**

We will provide a novel algorithm in order to increase through put for this WSN data transmission.