

## 基于神经网络的 SWIPT 接收机资源分配策略

张清宾, 李世宝

(中国石油大学(华东) 计算机与通信工程学院, 山东 青岛 266580)

**摘 要:** 无线携能通信 (Simultaneously Wireless Information and Power Transfer, SWIPT) 作为一种新兴的用于能量受限网络的技术近来受到广泛关注, 但现有 SWIPT 接收机资源分配策略只考虑实现当前时刻内网络最佳性能, 没有考虑未来时刻内的网络性能优劣, 无法满足服务质量要求高的网络. 针对此问题提出了一种基于神经网络的接收机资源分配策略, 首先从能量和时间的角度分别考虑延迟受限 (Delay-Limited, DL) 传输模式下的网络中断概率及其相应的中断区域, 推导出理论上实现最大吞吐量的资源分配策略, 然后利用神经网络预测未来时隙信道状态信息动态调整此策略. 实验结果表明在不同信道状态下, 所提策略能够实现更为稳定的网络性能.

**关键词:** 无线携能通信; 资源分配策略; 中断概率; 神经网络; 吞吐量

## SWIPT receiver resource allocation strategy based on neural network

ZHANG Qing-bin, LI Shi-bao

(School of Computer and Communication Engineering, China University of  
Petroleum (East China), Qingdao 266580, China)

**Abstract:** Simultaneously Wireless Information and Power Transfer (SWIPT) has been widely used as an emerging technology for energy-constrained networks. The existing SWIPT receiver resource allocation strategy only considers the optimal performance of the network at the current time. The network performance in the future is not considered, and the network with high quality of service requirements cannot be met. Aiming at this problem, a receiver resource allocation strategy based on neural network is proposed. The outage probability and its corresponding interrupt region in Delay-Limited (DL) transmission mode are considered from the perspective of energy and time. The resource allocation strategy that achieves the maximum throughput theoretically uses the neural network to predict the future time slot channel state information to dynamically adjust this strategy. The experimental results show that the proposed strategy can achieve more stable network performance under different channel conditions.

**Key words:** simultaneously wireless information and power transfer; resource allocation strategy; outage probability; neural network; throughput

**作者简介:**

张清宾 男, (1995-), 硕士研究生. 研究方向为无线携能通信. E-mail: m17071002@s.upc.edu.cn.

李世宝 男, (1978-), 硕士, 副教授. 研究方向为移动计算、无线传感网络、干扰对齐.