

未来 5G 通信中基于协同感知的能量有效性优化算法

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摘要: 针对未来 5G 通信网络频谱资源紧缺、高吞吐量和低功耗需求等难题, 研究了如何提高频谱资源利用率和能量有效性. 首先, 基于协同频谱感知方法和动态时分多址接入机制构建了 5G 认知网络模型. 其次, 推导出能量有效性函数表达式, 并给出多目标优化函数, 利用帕累托最优化方法将非凸函数转化为凸函数求取全局最优解. 最后, 通过仿真验证所提能量有效性优化算法在保证感知准确性和时间敏捷性的同时, 获得比其他两种方法更高的性能.

关键词: 能量有效性; 认知无线电; 协同频谱感知; 微微小区; 家庭基站

Cooperative Spectrum-aware Energy-Efficiency

Optimization for 5G Communications

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Abstract: To address the issues of spectrum inefficiency, high throughput, and low power consumption in 5G communications, we study the spectrum efficiency and energy efficiency issues. First, 5G cognitive network model, where cognitive femtocell coexist with picocell, was built based on cooperative spectrum sensing scheme and dynamic time-division multiple-access scheduling mechanism. Then, formulate energy efficiency function and optimization problem with respect to transmission power. To resolve the non-convexity of the formulated optimization problem, Pareto-optimal solution was involved in global optimality. The simulation results show that the proposed schemes significantly enhance the energy efficiency of the cognitive femto user compared with another schemes, and ensure the accuracy and time agility of spectrum sensing.

Key words: energy-efficiency; cognitive radio; cooperative spectrum sensing; picocells; femtocells

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