

## A Game Theoretic Power Allocation and Relay Load Balancing in OFDMA-Based DF Relay Networks

Yalda Farazmand  
Dept. Electrical & Computer Engineering  
University of Manitoba  
umfarazm@cc.umanitoba.ca

Wireless communication networks have significantly grown in the past few years. These networks are required to meet the expectations of all users irrespective of their locations. Having high data rate connectivity and overcoming capacity degradation in a cell edge area are examples of these expectations. To satisfy these increasing demands, efficient utilization of the transmission resources which are scarce and expensive are required.

The incorporation of orthogonal frequency division multiple access (OFDMA) and relaying techniques offer a promising structure for providing ubiquitous high data rate coverage [1],[2]. Advanced radio resource management schemes are crucial for the future relay networks [3].

In this work, a system with a single base station communicating with multiple users being assisted by multiple relays is considered. The relays have limited power which must be divided among the users they support. Thus, a relay selection and power allocation scheme is proposed. The users are distributed randomly and by applying the traditional relay selection scheme, it may happen that some relays have more users connected to them than other relays which results in having unbalanced load among the relays. Thus, by considering load balancing, an optimization problem is formalized in order to maximize the total throughput of the network. For solving the problem, a game theoretic approach is proposed to jointly consider relay selection, power allocation and relay load balancing.

### REFERENCES

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