International Journal of Advance Research in Engineering, Science & Technology(IJAREST),
ISSN(O):2393-9877, ISSN(P): 2394-2444,
Volume 2, Issue 5, May- 2015, Impact Factor:2.125

A NOVEL RADIO RESOURCE ALLOCATION AND MANAGEMENT SCHEME FOR OFDM WIRELESS NETWORK

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ABSTRACT

This novel of resource allocation scheme for OFDM-based next generation wireless network to avoid inter-cell interference by allocating PRBs (Physical resource blocks) and power allocation for improving the performance of cell-edge user, proposed work of this paper is giving highest weight factor to the cell-edge user compare to the cell-center user and holding the rank values,rank1for cell-center user and rank2 for cell-edge users,rank0 for no transmission of any user, from this scheduling we are calculating the single strength and identifying which user transmitting a data in network. This avoids the inter-cell interference (ICI) and maximizes the throughput of overall network.

Keywords-*OFDM, weight factor, wireless network, PRBs, interference management, rank values.*

1. INTRODUCTION

Our aim to improving the spectrum efficiency by reusing the frequency band and allocating the all PRBs (Physical resource blocks), PRBs are nothing but time and frequency resources which divided into small blocks called as PRBs each PRBs has twelve sub-carrier , as well giving the high weight factor to the cell-edge user ,weight factor is constant multiplicative factor for maximizing the weight of particular values this concept of allocating PRBs and weight factor reduces the inter-cell interference (ICI) using OFDM modulation technology. OFDM propose because it has combat frequency fading and high spectrum efficiency and multiple subcarrier reuse the blocks each of subcarrier modulated by different data symbol. The inter-cell interference aware in multi-cell OFDM network can be formulated to reduce the optimization problem by considering the SINR instead of SNR.

2. SYSTEM MODEL

A general system model consists of seven hexagonal cells; each cell has its own base station, BS station capacity of transmission in this paper is 30 watts. Each cell has number of users which are allocated within the cell-center zone and some are allocated cell-edge. Cell edge has heavy interference then the cell center user by adjacent BS station which creates the noise for transmitting the data. As shown in the fig.1 cell-1 has three users, to are in the cell-center and one at the cell-edge, cell-edge user getting a dominate interference from the neighboring cell. For avoiding interference allocating PRBs for particular user using heuristic algorithm.

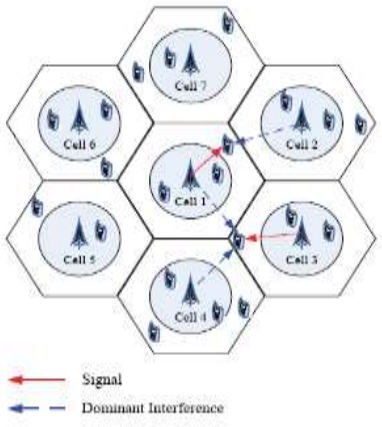


Fig. An example of an LTE network with inter-cell interference

2.1 Interference graph theory

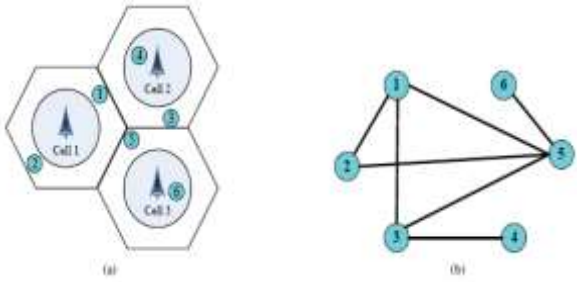


Fig2.Interfernce graph theory using three cells

In above figure showing that interference of cell-edge user using heuristic algorithm each node of cell-center and cell-edge is denoted by V,E node to node connection is draw by using different color as in cell-2 users shares there frequency band therefore it draw a graph. And cell-edge of all users gets interference with each other this can be shown of interference graph theory.

2.2 Problem Formulation

In this paper issue of problem formulation is allocation of one PRB at a time to one user among the number of users
in a cell , number of PRBs use in this concept is twenty-four this twenty-four PRBs is allocated to twenty-four users
twenty-fifth users has to wait for next time slot in same frequency band for getting the PRBs among twenty-four.

$$a_{mn}^{j} = \begin{cases} 1, if\ PRB\ n\ is\ allocated\ to\ m\ users \\ 0, \qquad otherwise \end{cases}$$

2.3 Optimization Problem

Our aim is to maximize the overall throughput of cell-edge user and improving the balance performance between the cell-center and cell-edge user ,reason behind this concept is cell-center user do not suffer from heavy interference. So we are increasing the rate factor of cell-edge user than the threshold of cell-center user.

$$\sum_{m=1}^{M_C^j} R_m^j \geq R_t$$

Where R_m^j is rate capacity of cell-edge user and R_t is threshold of cell-center user.

3. METHODOLOGY

Methodology is used in this concept is heuristic algorithm and interference graph theory and algorithm for PRB allocation based on the weighted SNR.

3.1 Hardware requirements

3.1.1 Intel Pentium fourth processor

3.1.2 RAM of 2GB

3.1.3 HDD of 20GB

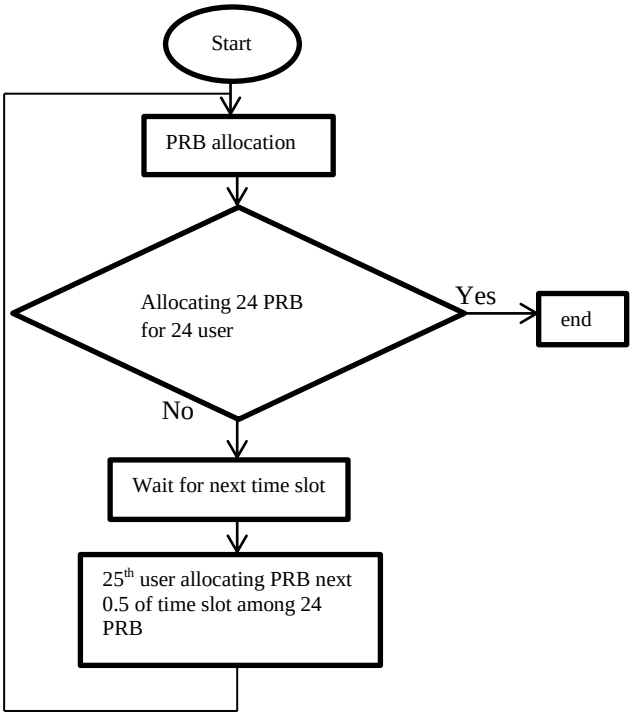
3.2 Software requirements

3.2.1 Operating system: window xp, window 7, window 8

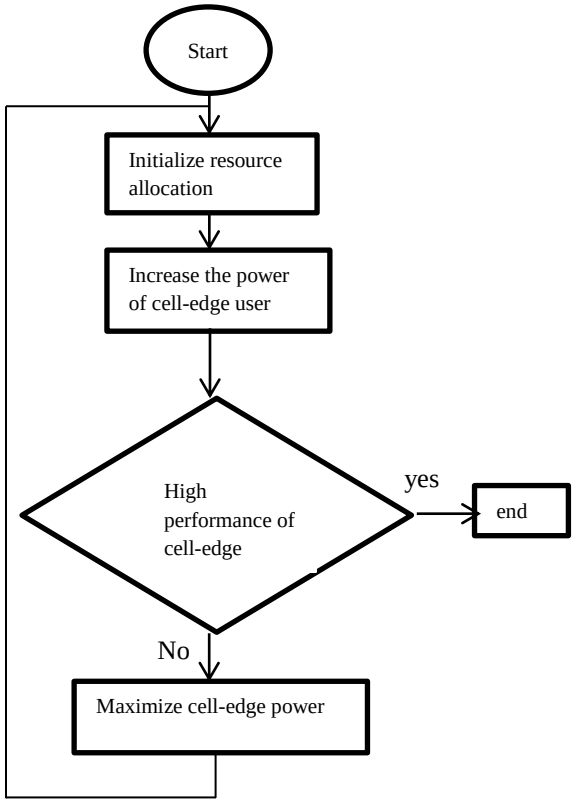
3.2.2 Matlab (version R2012b)

4. FLOWCHART FOR PROPOSED WORK

4.1 Flowchart of PRB allocation



4.2 Flowchart of power allocation



5. STIMULATION RESULTS

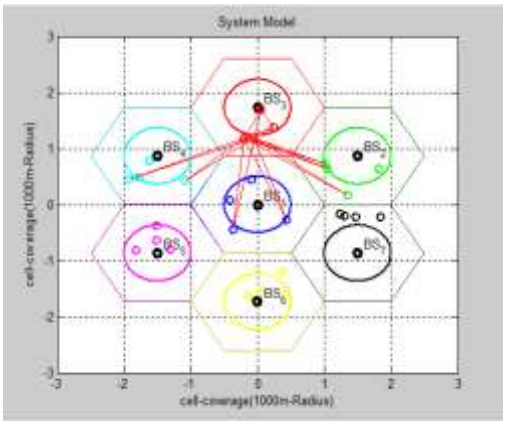


Fig-3 interference of cell-edge

Above fig-3 shows the basic system model with inter-cell interference among the edge cells a dominate interference which shown in red color and each of reference cell is shown by different. cell coverage area is 1000m-radius and total power transmission per-cell is 43dB.

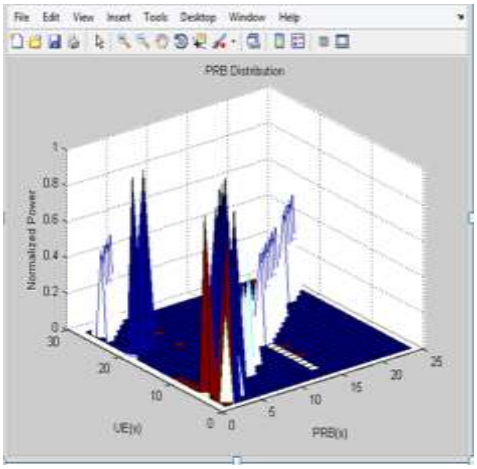


Fig-4 peak average power for cell-edge user

Fig-4 shows the peak average power for cell-edge user which is shown in blue color and reaming color shows in white which indicates the cell-center users.

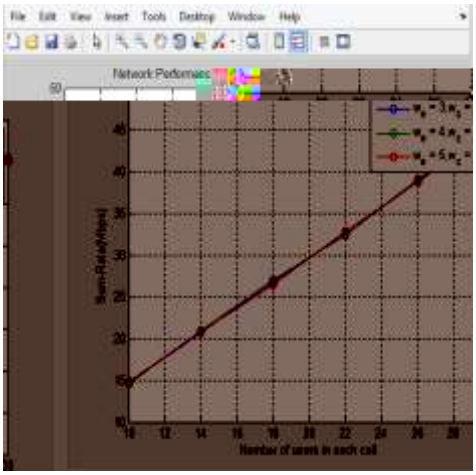


Fig-5 Network performance of cell-center in sum of rate

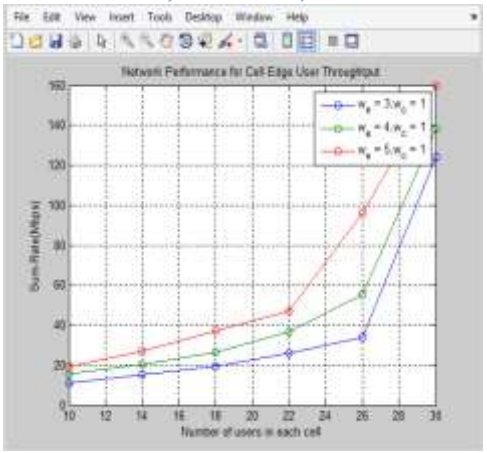


Fig-6 network performance of cell-edge in sum of rate

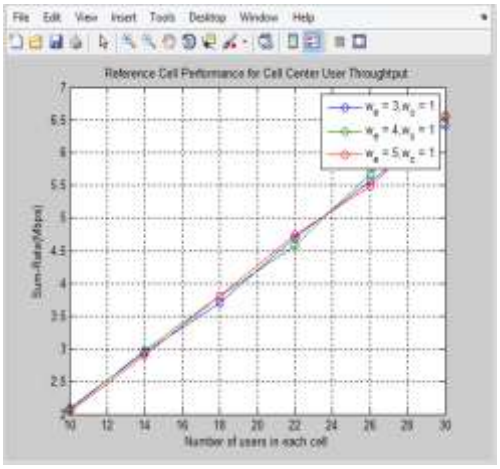


Fig-7 Reference cell performance for cell-center in sum of rate

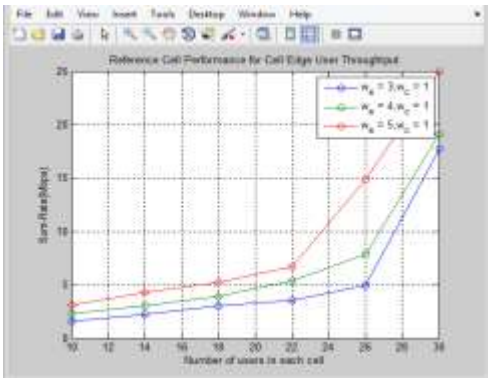


Fig-8 Reference cell performance for cell-edge user

In our proposed work keeping the cell-center value constant for all weight factor and calculating the sum of average rate of user in a cell instead of average throughput of cell.

6. APPLICATION

1.Use in radio single concept for reusing of frequency band using OFDM modulation.

7. FUTURE SCOPE

By keeping the weight factor constant for cell-center user and giving high weight factor to the cell-edge user balancing the performance of both the user which improve the throughput of network.

CONCLUSION

In this paper, a resource allocation scheme is proposed for multi-cell OFDM in cellular network and radio resource. Heuristic algorithm is proposed for efficient balancing the cell-center and cell-edge user allocating the more power to the cell-edge user with high weight factor and rank value which improve the overall performance of cell in a network.

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