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COMPARISON BETWEEN MODIFIED ADAPTIVE STEP POWER CONTROL ALGORITHM AND NOVEL ADAPTIVE STEP POWER CONTROL ALGORITHM

Akhilesh Panchal, Rajeev Kumar, Prajatanta Gangele
Lectutrer, PG Sholar

ABSTRACT

In this papers we worth on comparative study between modified adaptive step power control algorithm and novel adaptive step power control algorithm for efficient use of power between mobile and base station, both the algorithm uses dynamic step size for increase the performance of the system. In the Novel adaptive step power control algorithm uses Δdiff based on difference between SIR target and SJR etc. which are discuss in this paper. In the modified adaptive step power control algorithm we use three step for adjusting transmitted power of the mobile station using three initial parameter 'δ' step sizes 'm' increasing factor, 'V' decreasing factor. Finally in this paper we comparing signal to noise ratio at target receiver and signal to noise ratio at Base station .

Keyword:- ASPC (adaptive step power control), NASPC (Novel adaptive step power control) MASPC (modified adaptive) step power control) SNR, δ, m,v, FDD, TDD, UMTS.

INTRODUCTION

The UMIS air interface uses the code division multiple access (CDMA) technique increase the spectral efficiency power is an important tool in wireless communication generally power control are in two ways open loop power control and close loop power control. Open loop power control are used for reducing slow fading called as slow power control method whereas closed loop power control method are used for reducing the interference due to multi path fading by this reason it is called as fast power control method in this paper we concentrate on signal to noise ratio (SHR) The Target SIR value are fixed, this value are set by outer close loop power control based on SJR estimated, and bit error rate od the receiver. The individual mobile's SJR value are set by inner close loop power control method for achieving nearest SJR target value[1]. The transmission unit in the UMTS-WCDMA interface is a 10 ms frame each frame is divided into 15 time slats and each slat contains one power control common (up or down) in this paper two algorithm are consider[4].

SYSTEM MODEL

We use very simple model for realizing our algorithm this also allowcomparisons between power control algorithms.

$$\left(\frac{S}{I}\right) = \frac{E_b R_i}{N_0 w} = \frac{g_{Ji} P_i}{\sum_{k=i}^{u} p_{jk} p_{kt} n_j} = y_j$$

Where E_b stands for bit energy, no is the noise spectral density, W is the chip rate, R_i is the information rate.

NOVEL ADAPTIVE STEP POWER CONTROL ALGORITHM

Novel adaptive step power control algorithm are used for reducing instability that occur in adaptive step power control algorithm, due to difference between SIR target and SIR estimate[4]. In the Novel adaptive step power control method update step on the basis of the difference between SIR target and SIR estimate. So that the SIR estimate of the MS's do not jump level up a down crossing the SIR target

Steps of Novel Adaptive Step power are follow as.

1. The difference between the SIR target and SIRestimate ,Δdiff would be measure in case of each mobile station, which expressed in dB.
2. The update step size would increase m timesΔdiffwhen successive up commands are received.
3. The update step size would decrease V times Δdiff when successive down commands are received.
4. This value is divided by λ when power update command sequence is an alternate sequence of up and down command.

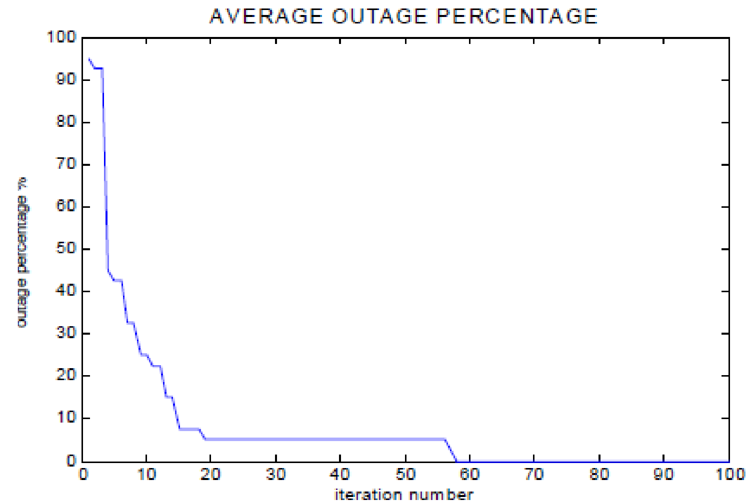

Figure 1.1 Showing the Convergence Speed of NASPC

MODIFIED ADAPTIVE STEP POWER CONTROL ALGORITHM

The modified adaptive step power control algorithm (M-ASPC) is an improvement on the adaptive step power control algorithm[5]. In the ASPC algorithm it was observed that It's having faster convergence but It has significant instability at low outage percentage M-ASPC also reduces this problems. steps of M-ASPC algorithms.

1. At first base station measure, SIR observation at present stage.
2. If SIR observes value is less than SIR target three condition occur.
   a. If SIR observe of previous stage are less than SIR target BS ask to MS to Step up Txpower by 'm δ'.
   b. If SIR observe of previous stage are greater than SIR target then BS ask to MS to step up by 'δ'
   c. If initial power allocated cause SIR observe value less that SIR target than BS ask to MS to step up Tx power by 'm δ'.
3. If SIR observe value is greater than SIR target then three condition occur
   a. If SIR observe if previous stage are greater than SIR target then BS ask to MS to step down Txpower by 'V δ'.

   b. If SIR observe of previous stage are less than SIR target then BS ask to MS to step down Tx power by 'δ'

   c. Ifinitial power allocated cause SIR observe greater than SIR target then BS ask to MS to step downTx power by 'VS'.
4. Updated Tx power goes to BS.

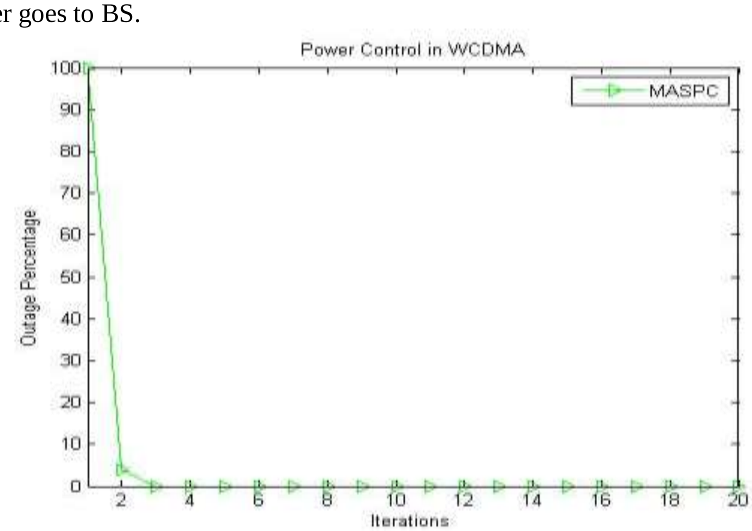

Figure 1.2 Showing the Convergence Speed of MASPC

Table1.1 Showing Comparison Between NASPC and MASPC

Factor	**NASPC**	**MASPC**
Outage percentage at the time of iteration 20	Outage percentage 5%	Outage percentage 0%
Stability of the System	It showthe smooth convergence, stability moderate.	It show the linear convergence , higher stable than NASPC
Circuit Complexity	Complexity moderate	Complexity moderate
Iteration needed to bring outage to 0%	60 iteration	3 iteration

CONCLUSION

In the graph, we clearly see that novel adaptive step power control algorithm reduce instability but considerable outage probability are occur then performance at NASPC are degraded . In the modified adaptive step power control algorithmthem are better in term of stability as well as speed then also increasing system performance. The most important feature of MASPC is that it achieve zero percentage outage at only 3 iteration and NASPC achieve at 60 iteration.

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