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Modified Adaptive Power Control Algorithm for 3G Mobile Networks using CIR Technique

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Abstract: - In this paper, we evolution of modified adaptive power control algorithm for universal mobile Tele-communication system (UMTS). In the modified adaptive power control algorithm transmitted power maintain in stabilization zone, by the modified adaptive power control algorithm the complete elimination of oscillation between CIRest and CIR target. The modified adaptive power control algorithm used in both link directions of frequency division duplex (FDD) and time division duplex (TDD) In this paper we see that increase the system capacity and reduce outage probability and reduce the transmitted power stabilization zone.

Index terms: - UMTS, FDD, TDD, Modified adaptive power control (MAPC) algorithm, 3G

1 Introduction:- Power control algorithm in the universal mobile telecommunication system (UMTS) were specified for FDD and TDD mode respectively the outer loop power control dynamically adjust the target carrier to interference ratio called channel is achieved by the inner loop power control algorithm close loop power control is used to access the problem of fading that effect the wireless communication at first open loop power control algorithm then close loop power control algorithm is used. The transmitted unit in FDD and TDD mode is a 10 msframe[1]. Each frame is divided into 15 time slots in the modified adaptive power control algorithm transmitted power is updated once in every 5 time slots

2 System Model:-

The block size is 200x200 m^2 for evaluation of modified adaptive power control algorithms mobiles are uniformly distributed and each mobile serves the best base station. assuming propagation model for fast fading as

$$G_{i,j,t}= a_{i,j}f_{i,j}/d_{ij}$$

Where d_{i1j} is the mobile to base distance expressed in meter the coefficient a_{ij} is a log normal time constant random variable models the shadowing effect and ft_{ij} models the fast fading at time.

The auto correlation function in exponential may be as

$$R(\Delta x) = e^{\frac{-\Delta x}{dcor}}\text{Ln}(2)$$

Δx = path Length

Dcor= decorrelation distance

3 Modified Adaptive Power Control Algorithm:- Generally in mobile networking the carrier to interference ratio estimated as CIRest can oscillate even if the radio interface parameter are stable in the modified adaptive power control algorithm add. Intelligence to the receiver in order to ask the transmitted to stabilize its power. The modified adaptive power control algorithm doesn't need more TPC bits. the MAPC algorithm reduce the oscillation variance around the CIR target also reduce the power

consumption by creating a stabilization zone above the CIR target the MASPC algorithm combines the principle of adaptive power control algorithms with the new concept of stabilization zone[4]. Modified adaptive power control algorithm uses an adaptive power control algorithm to mitigate the variation of radio interface the use of stabilization zone decrease the needed margin value which is accepted in limited value , therefore system capacity increased by the modify adaptive power control

3.1 Modified adaptive power control algorithm each mobile station compares CIRest with CIRtarget and generates TPC commands, which is target given below.

(a) If CIRest>CIRtarget +Ø then transmitted TPC is set to 'O' requesting a transmit power decrease.

(b) If CIR target ≤ CIRest ≤ CIRtarget + Ø then transmitted TPC is the complementary of the previous TPC requesting an unchanged transmitted power.

Parameter Ø (in dB) is the range of the stabilization zone 'Ø' based on the system load.

3.2 In the modified adaptive algorithm base station work as:-

(a) If the instantaneous and the saved TPC Commands are the same, the transmitted power is updated using the previous Δ step, which is then multiplied by u. this new Δ step by decreasing the oscillation outside the stabilization zone.

(b) If the instantaneous TPC command is different from the saved command, Δ step is divided by λ and the transmitted power in stable mode.

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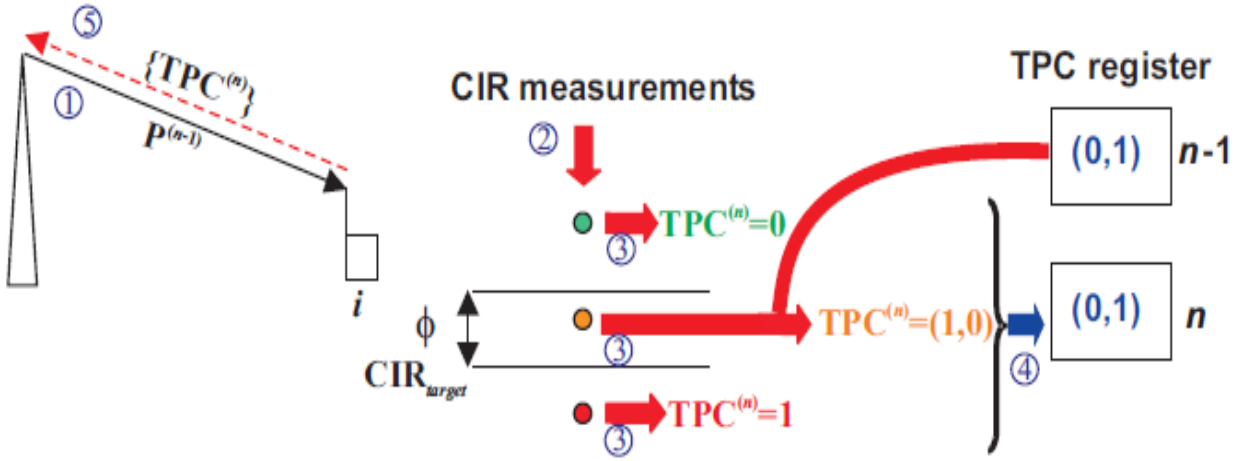

Figure 1 Showing that MAPC Algorithm Step in Mobiles[5]

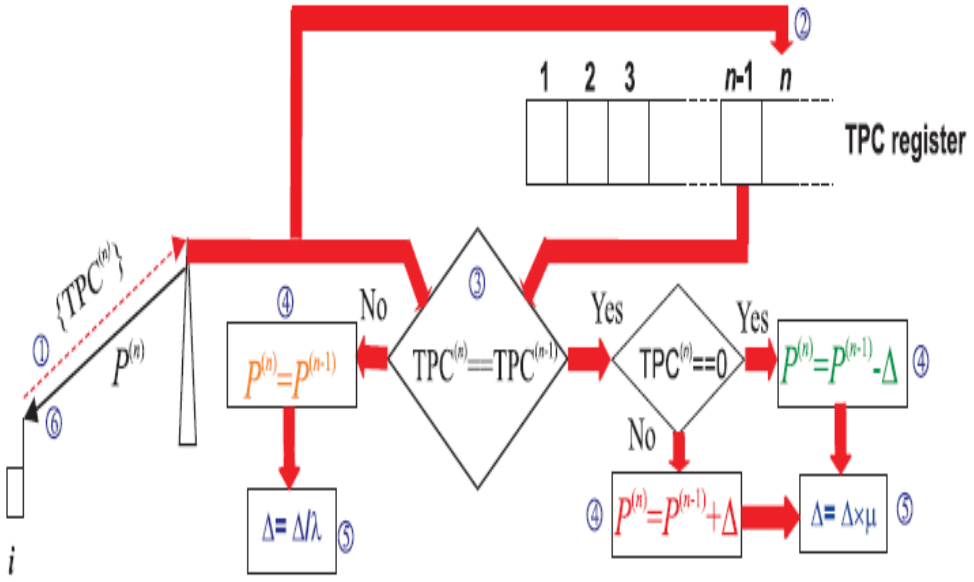

Figure 2 Showing that MAPC Algorithm Step in Base Station[6]

4 Conclusion :-

The modified adaptive power control algorithm performance is evaluated using frame outage probability which is the geometric average of the received CIR over the transmission time interval (TTI) fall below CIR target after we analysis that modified adaptive power control algorithm uses the adaptive scheme and addition to the proposition of the stabilization zone. Modified adaptive power control algorithm gives the best result in term of complete elimination of the oscillation of difference b/w CIRest and CIRtarget for better result in term of power consumption , outage probability , CIR Margin , oscillation b/w CIRest and CIRtarget is the value of parameter are very accurate chosen.The modified adaptive power control algorithms are very useful in mobile network where difference between CIRest and CIRtarget is very high.

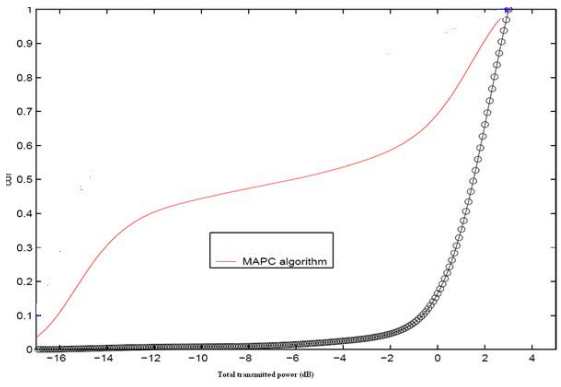

Figure 3 Showing Graph For MAPC Algorithm

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