Characterization of Throughput in Optimization of Data Transmission Network in Nigeria

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Abstract -It was discovered that when noise and interference are negligible, received power balancing maximizes the base station throughput provided the population of active terminals does not exceeds an optimum size. Throughput is the average rate of successful message delivery over a physical or pass through a certain network node. However, this paper focuses on the amount of processed data communication network, transmitting power control and the number of terminal that should be admitted into code division multiple access (CDMA) system in order to maximize the base station throughput for a wireless data transmission network.

Key Words- Least Mean Square Algorithm, Voice Actualization Technology.

INTRODUCTION

The aim of system designer, telecommunication users, and researchers involved in communication theory are often interested in knowing the expected performance of a system following the success of cellular telephone services in the 1990s. Code division multiple access has become the focus of current research to provide higher data rata for end users over a channels. Throughput is a key measure of quality of a wireless data link and it is an average rate of successful message delivery over a communication channel. The message or information divelivery may be over a physical or logical link or over a wireless channel passing through a certain network node such as data passed between two specific computers. This throughput wireless communication system depends on a number of variables which includes pullet size, transmission rate, the number of overhead bits in each packet, received signal power received noise power spectral density, modulation techniques and channel condition. The main key of to maximizing throughput is maintaining the signal to-interference and noise (SINR) at optimum level which derives its final performance.

2.0 Least mean square Algorithm is a gradient based approach-Gradient based algorithms assumes an established quadratic performance surface. When the performance surface is a quadratic function of the array weights, the performance surface (w) is in the shape of an elliptic paraboliod having one minimum. One of the best way to establish the performance surface is by finding the maximum signal to interference error. The error can be written as;

$\partial(k) = d)k) – y (k)$ - - - - - (1)

Where $\int (k) = W^H x (k)$

$\partial(k) = d (k) - w^H x (k)$ - - - - - (2)

Squaring the error gives

$[e(k)]^2 = d [d (k) - W^H x (k)]^2$ - - -

- (3)

Expanding the squared errors gives

$[e(k)]^2 = [d(k)]^2 – 2d (k) W^H x (k) + W^H$

$X(k) x^H (k) w$ - - -

- (4)

Simplifying the equation

$E[(e(k)]^2] = E [1d(k)/^2] + W^H (k) Rxx W (k) – 2W^H (k)r$- (5)

Writing it interms of cost functions becomes

$J (w) = D – 2 W^H r + W^H + Rxx W$ - - -

(6)

Employing the gradient to locate the minimum, it becomes

$\nabla w [J (w)] = 2 RxxW – 2r$ - - - -

- (7)

The minimum occurs when the gradient is zero, thus the solution for the weights which is the optimum whenever solution (w or w_{0pt}) is given by

$O = 2 RxxW – 2r$

$W = Wopt = Rxx^{-1}r$ - - - -

- - (8)

Voice actuation technology. Code division multiple access is the only access technique that takes advantage of the nature of human conversation. In conversation, voice activity cycle is 35%, the rest the time we are listening. Code division multiple access (CDMA) allows the users to share one radio channel because each channel user is active just 35% of the entire cycle, all other benefits with less interference in a single CDMA radio channel is achieved.

3.0 METHODOLOGY

A forward error correction (FEC) encoder if present and a cyclic redundancy check encoder together expand the packet size of to mbits.

The code division multiple access gain is

F = W/Rs - - - -

- - - (9)

Where W (H_2) is the system bandwidth and is propositional to RC, terminal i contains a radio modulator and as transmitter radiating power pi watts. The path gain from transmitter i to the base station is hi and the signal from terminal i arrives at the base station at a received power level.

Q_1 = pihi (W) - - - - -

- - (10)

In this analysis, the details of the transaction system are embodied in mathematical function which stand as F (x) which is also the mobability that a packet arrives at the CRC decoder without error. The dependent variable Y is the received SINR for Terminal i,

$$\text{ti} = a \sum_{j=i}^{\frac{pihi}{N}} \text{pihi} + \quad - \quad - \quad - \quad -$$

Substituting equation 10 into equation II we obtain.

$$\text{Ti} = G \sum_{j=i}^{\frac{Q1}{N}} \text{Qi} + \sigma 2$$

Messages acknowledge from the receives inform the - -
of errors detected at the CRC decoders that have corrected by the channel decoder. The transmitte selective repeat retransmission of packets received in error. It is assured in parts of this analysis that intra cell interference dominates the total distortion and study of the signal to noise ratio of the receiver is define as

si

Substituting this into equation 12 we obtain

shaped function of Y, with F (0) = 2^{-m} 0 and F (∞) = 1.

4.0 Data Presentation and Analysis

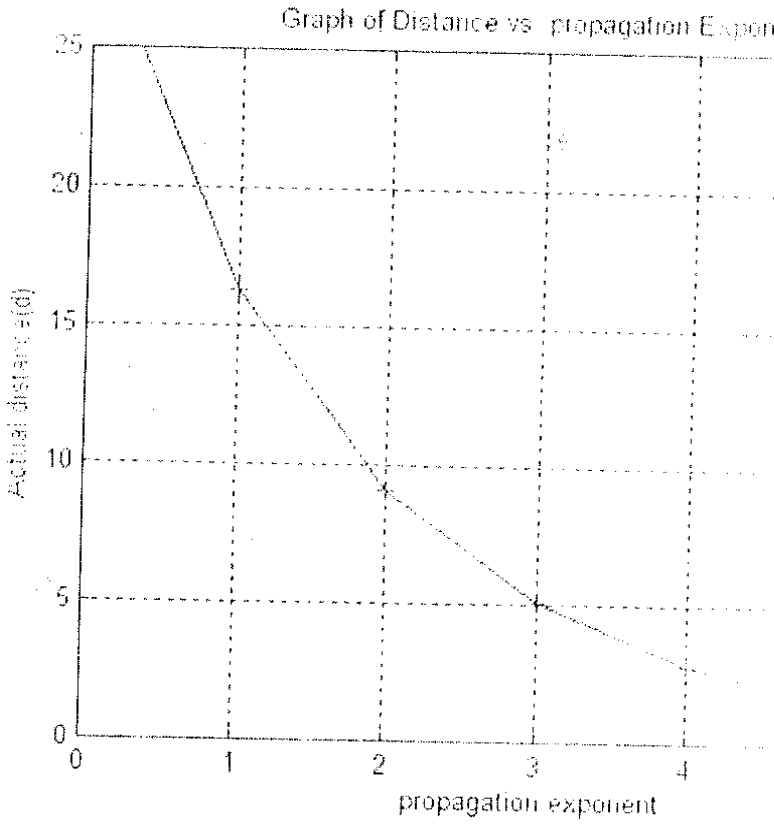
The effect of the desired terminal propagation exponent on operating range. We observed that a small value of propagation exponent for a terminal yields a wider operating range (longer distance) and thus a significant increase ir system performance than longer value of the propag exponent. The reason for such performance exponent term leads to more frequent attenuation of signal, thus yielding red operating range and higher signal to noise ratio (SNR) fo terminals. In this analysis the effect of distance (d) on propagation exponent was simulated against distance propagation exponent.

MATLAB CODE FOR DISTANCE AGAINST PROPAGATION EXPONENT

X = 0:1:6

T = 0:5:25

T = (29.387)* exp (-0.586.* (*));



5.0 CONCLUSION

This paper provides a detailed analysis on how to optimize the throughput in code division multiple access network through power control by simulating models with relevant parameters. Numerical results and discussion have shown that interference generated by users of the network in the form of noise has been minimized with the help of the model derived which can aid in transmitting signals to the base stations of code division multiple access with equal strongest power.

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