Multiple users can be served by the same bandwidth in wireless CDMA systems of spread spectrum. The use can use the bandwidth and different codes at the same time and any signal showed by one of the user is seen as interference. This interference is detected to the base station in the process of extracting data used by a specific signal utilized by a user. Users who are closer to the BS are the ones receiving greater signal and those who are far from the BS can be interfered with by those closer.

This is known as the near-far problem. Power control in the up-link channel have been suggested through power transmitting strategies for the users to maximizes battery life and interference while at the same time keeping the data they require for QOs. This project will, examine the literature of power evolution of the technique of power control and then provide the schemes involved in detail. This study will present the power control techniques used in the cellular radio system of the CDMA.

**Power control techniques classification**

TDMA/ FDMA are the cellular systems which are needed for power control caused by the co-channel interference. This is a requirement in enabling the reuse of the same frequency in the system of different cells. All the users in a cell DS-CDMA share common resources. Whenever there is no any power control, the mobile station at each station works towards the transmission of power to the base station at the same power level.

This is due to the non-zero cross-correlation between the sequences of the chip which is provided to the BS signal users. MSs interferes with a specific MS which is the near–far problem which when not corrected will lead to high degradation of performance. The control of power is therefore a very crucial element for the function of the DS-CDMA.

**Literature review**
The Code Division Multiple Access (CDMA) is a method of Channel access used in radio communication technologies (Ipatov, 2000). CDMA employs the technology of spread-spectrum and another special scheme of coding whereby there is a code assigned to each transmitter. This enables a single channel to multiplex multiple users. TDMA meaning time division multiple access on the contrast is means for time division and frequency –division multiple access which is abbreviated FDMA Deals with the division of frequency.

The signaling of the spread –spectrum forms the CDMA because the high data bandwidth from the modulated coded signal is higher compared to the communicated data. Data from this technique is spread uniformly at each transmitted power. The pseudo-random code is spreading of the code which has a narrow ambiguity code compared to other pulse codes. CDMA is a code which is locally produced and runs at a higher rate compared to the transmitted data. Bitwise XOR of the transmitted data combines with the much faster code.

A data signal which has pulse duration of Tb combines with the code signal having a pulse dilatation of Tc through XOR. The bandwidth of the signaled data is threfore1/ Tb while the spread spectrum signal width is 1/Tc. This is because Tb is much bigger than Tc. The spread spectrum signal bandwidth will them be larger compared to the original signal's bandwidth.Ratio Tb/ Tc is referred to as the processing gain or the spreading factor which determines the upper limit extent of the number of users required to be supported by the base station in a simultaneous way (Dubendorf, 2003).

The CDMA system users use different codes to regulate the signal they are sending. In the CDMA system, it is important to select the code required to be used by the users through modulating of the signals. A proper separation between the signals of a group of users and the desired users leads to the bet performance of the whole system. This separation is made through the processing of correlating the signals received with those codes which are locally generated by the desired users.

The matching of the signal with the desired code given by the users means that the functioning of then systems is co relational characterized by the ability of the system to extract the signal. Likewise when the code desired by the user is not in related with the signal then there is any communication commonly knows as the cross-correlation.

But when there a correlation of the code with the signal at any time then this correlation at any time should be close to zero. This aspect is known as the auto correlation commonly used in multi-path interference rejection (CDMA Spectrum, 2008). CDMA in general is categorized under two main aspects which can either be asynchronous (pseudorandom codes) or synchronous (orthogonal codes).
The synchronous category of CDMA uses properties of mathematics of orthogonality between vectors which represent the strings data. This for example is the 1011 binary string which represented in the vector(1,0,1,and 1). These vectors are derived from the dot product and summing the respective component products. Zero dot product means the orthogonal of the two vectors in relaxation to each other. This is said that if \( v=(c, d) \) and \( u=(a, b) \) then the dot product \( u.v =ac+ bd \). The understanding of the operation of the W-CDMA captivity can be improved by looking at the properties of the dot product.

Every end user in the synchronous CMDMA uses the orthogonal code of the other code to modulate the signal. From the Orthogonal Walsh sequence, it shows that two users in a synchronous system can be multiplexed together. This is a technology known as the CDM code division multiplexing. Another 4 Walsh sequence indicate that four users can be multiplexed. All the users who have been multiplexed are required to coordinate so that each of them transmitters, the sequences they have been assigned and that each of this signal reaches the receiver at the same time.

This is technology commonly seen in base-to -mobilize links where there is an origination of transmission from on a single transmitter which is coded in a –perfect way. The pseudo-noise or the pseudo-random sequence are directed to the asynchronous CDMA system because these sequences are not possibly to be mathematically calculated to form signature sequence because they are both arbitrarily and in their orthogonal structure making maximum utilization of the code space.

**Advantages of asynchronous CDMA**

Compared to other techniques the asynchronous CDMA is advantageous in terms of its efficiency in the fixed frequency spectrum utilization. FDAM, TDMA and CDMA have the same efficiency in their spectral theory but in practical terms, they are various challenges shown by each of them for example for CDMA, power control is the main challenge while TDAM is on timing and FDAM in filtering and frequency generation.

A system of the TMA has to function carefully in synchronizing the phase of transmission in terms of time to the users. Each of this time slots requires to be checked for interference because this is not possible in an environment which is not stable. Another Advantage is on the resource allocation. This key advantage is offered by asynchronous CDMA which allows allocation of resources in a flexible way which, earns that the active users are allocated PN
code. The case of FDMA, TDMA and the synchronous CDMA.

The Orthogonal code number, frequency lot and time slot are fixed which leads to a limited supply of capacity to each user. The fixed number of timeslots, codes and frequency band which is allocated for TDMA, CDM and FDMA systems which remain underutilized because of the nature of packetized transmission data and the nature of telephony. The magnitude of the spread-spectrum characteristic enables a greater magnitude more than the required bandwidth signal.

Current practical implementation

It is a normal occurrence for an object which moves on the surface to be on in the steps it is in the modern day. The modern equipment of modern navigation is used to inform the user of his or her coordinate, current and the most precise time, the coordinate axes velocities and the predicted time.

These advanced technologies give a solution to the Global Positioning systems’ tasks the GPS is a space–based system which places transmitters and opens the way to the employment of the radio waves UHF for navigation transmission the UHF waves as compared to the earlier longer waves which were ground based systems, have been placed to receives information only on a straight line.

With lack of diffraction so that in the process of employing them in the terrestrial remitters it will make it possible to position within the horizon zone around the beacon. The UHF band at the same time is much more improved than the old long waves in regard to mass and dimensions of the receive and transmit antenna as well and many other equipment components. The need of UHF band desires to receive a wide ranges of geographical of the navigation transmitter is clearer.

Reference

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Dubendorf, Vern A. (2003). Wireless Data Technologies. John Wiley & Sons, Ltd.: It provides me with general understanding of wireless multiple access technique and to compare CDMA with other multiple access technique.