

Last Updated: 30/8/05

## **Tutorial B:**

- 1. Relevant Background Material for understanding CDMA paper:**
  - Multiple Access & CDMA
  - Walsh/hadamard matrices
  - Direct Sequence CDMA with
    - BPSK Modulation
    - QPSK Modulation
    - Many Orthogonal Modulation
  - Fading Channels
  - Rake Receivers
  
- 2. CDMA Applications (See Intro to Tutorial B: Section 4, pt 5)**
  - PN sequences for cdma.
  - Satellite/Military Applications of cdma.
  - Cdma2000/WCDMA (3G).
  - MC-CDMA (4G).
  - TD-CDMA (3G).
  - Receiver designs.
  - ? (add the CDMA application you are interested in investigating here)
  
- 3. For Tutorial B report, students *can work individually* or in Groups of two or three.**

## **Tutorial B Summary:**

**Week01: No Tutorial.**

**Week02: Thursday 28 July**

- Introduction to Tutorial B.
- Discussion about course content (in particular students requested examples of real time audio filtering using Matlab).

**Week03: Tuesday 2 August**

- Numerical examples of DS/CDMA spreading using Walsh codes.
- Read pages 1-10:  
R. Prasad and T. Ojanpera, "An overview of CDMA evolution towards wideband CDMA," *IEEE Communications Survey*, vol. 1, no. 1, pp. 2–29, Fourth Quarter 1998.

**Week04: Tuesday 9 August**

- Detailed analysis of DS/CDMA with BPSK.
- Read handout on DS/CDMA with BPSK and QPSK.
- Vectorized Matlab programming examples.

**Week05: Tuesday 16 August**

- Introduction to IS-95 CDMA forward and reverse link channels.
- Detailed analysis of block diagram of IS-95 CDMA reverse link traffic channel.
- QPSK and DSSS simulation examples.
- Please read Holtzman paper Sections I and II.

**Week06: Tuesday 23 August**

- Section I and II discussed in detail.
- Equations for baseband representation of TX signal investigated.
- Fundamental channel models (AWGM, Rayleigh, Rician) identified.
- Please read Holtzman paper Sections III.
- Useful reference: J. S. Lee and L. E. Miller, *CDMA Systems Engineering Handbook*. Artech House, 1998.

**Week07: Tuesday 30 August**

- Tutorial B Group formation finalised.
- Receiver block diagram and receiver equations (Section III) discussed in detail.
- R. Price and P. E. Green, “A communication technique for multipath channels,” *Proceedings of Institute of Radio Engineers (IRE)*, vol. 46, pp. 555–570, Mar. 1958.