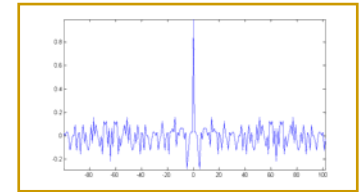

ECE 5660 – Spread Spectrum Communications Spring 2008



Instructor: R. Michael Buehrer
Class Project Description



Grading – Research Project (25%)

- The course will include a group “research” project.
- You will carry-out a semester-long project
 - 25% of Final Grade
- Topic – On the use of spread spectrum principles (e.g, interference averaging, frequency diversity) in 4G and emerging systems. Examples:
 - WiMax
 - 3GPP2 Long Term Evolution (LTE)
 - Other emerging standards
- Should be a combination of literature/standard survey and computer simulation (preferably Matlab or C) and analysis
- Work as individual or in small groups (1-3 people)

Project Topic

- Third generation systems relied heavily on spread spectrum principles
 - Explicitly used CDMA
- Emerging systems are using OFDM physical layer with TDMA/burst access
- However, for multi-cell operation interference is largely mitigated through interference averaging approaches which are based on spread spectrum principles
- Fading is often mitigated using frequency diversity (also based on spread spectrum)

Project Topic

- Your goal is to choose an emerging 4G system (e.g., WiMax, LTE) and
 - determine which spread spectrum principles are exploited
 - examine the performance of specific aspects of the system which relate to spread spectrum principles
 - Compare the multiple access technique used to CDMA
- The examination will be a combination of literature survey, simulation and analysis

Important Project Info

- January 29: Project Proposals Due
- April 12: Oral Project Presentations (NOTE: Saturday)
 - Spread spectrum “Mini-Conference”
- April 22: Written Projects Due
- Project Grading
 - Communication skills (oral and written) 25%
 - 10% from presentation and 15% from report
 - Technical accuracy 25%
 - 5% from presentation and 20% from report
 - Completeness in results (based on proposal) 30%
 - 10% from presentation and 20% from report
 - Conclusion (what do your results show?) 20%
 - 5% from presentation and 15% from report

Project Format

- The goal of the presentation (and the report) is to present to the class a tutorial overview of how spread spectrum principles are being exploited in emerging standards
- Thus, they *should not* focus on
 - basic ideas in digital comm. or spread spectrum
 - too much of the fine details of the standard (unless absolutely necessary)
- They *should* focus on
 - how concepts presented in the course are being used either explicitly or implicitly in the new system
 - how the performance or capacity is enhanced (analysis or simulation should be used here)
 - how the system differs from the systems studied in class
- Format of the report can follow the format of the class text

Presentation Format

- The presentation should last 20 minutes
- This means that no more than 20 slides can be used (15 is more reasonable)
- Every member of the group should present
- Use of figures, plots, charts is encouraged
- Extensive use of dense text discouraged

Report Format

- The report should
 - be approximately 10-20 pages including figures
 - written in a tutorial style
 - written at a level accessible to any member of the class (i.e., assumes good understanding of digital communications and basic understanding of spread spectrum principles)
- The report should not
 - make extensive use of figures from standards (1 or 2 are fine with proper sourcing)
 - be too basic

Report Format

- The report should have clear section headings
- All figures should be labeled and have captions
- All tables should be labeled and have captions
- Clearly cite all sources
 - Must use standard IEEE-style citations/reference list