<table>
<thead>
<tr>
<th></th>
<th>Lemper-Ziv compression and its error detection/correction properties.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1) Fading channels - capacity of fading channels and multiple antenna systems</td>
</tr>
<tr>
<td></td>
<td>2) Adaptive Equalisation (Least Mean Squares, Recursive Least Squares)</td>
</tr>
<tr>
<td></td>
<td>3) RAKE receiver for fading multipath channels</td>
</tr>
<tr>
<td></td>
<td>4) Multiuser detection in DS-CDMA – Optimum receiver</td>
</tr>
<tr>
<td>2</td>
<td>1. Tomlinson Harashima Precoding for ISI channels</td>
</tr>
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</tr>
<tr>
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</tr>
<tr>
<td>3</td>
<td>1. BER in Ricean fading channel</td>
</tr>
<tr>
<td></td>
<td>2. BER in slowly fading Rayleigh channel</td>
</tr>
<tr>
<td></td>
<td>3. Turbo Equalisation</td>
</tr>
<tr>
<td>4</td>
<td>1) Adaptive equalization especially Kalman filters.</td>
</tr>
<tr>
<td></td>
<td>2) DS-CDMA spread spectrum principles</td>
</tr>
<tr>
<td></td>
<td>3) Turbo Equalization</td>
</tr>
<tr>
<td>5</td>
<td>1. BER in Rician fading channel (+BER in slowly fading Rayleigh channel as a special case)</td>
</tr>
</tbody>
</table>
| 7 | 1) Multiuser Communications - Multiuser detection in DS-CDMA-Optimum receiver, decorrelating detection, successive interference cancellation - chapter 15  
   2) Adaptive Equalisation (Least Mean Squares, Recursive Least Squares, Kalman Filtering), blind equalization (Constant modulus Algorithm and Bussgang techniques)  
   3) Direct Sequence CDMA - spread spectrum principles. frequency hopping versus direct sequence, RAKE receiver for fading multipath channels, synchronization in DS-CDMA systems |
|---|---|
| 8 | 1. adaptive/blind equalization  
   2. cdma-ds spread spectrum, fh vs ds  
   3. MAP Symbol-by-Symbol Detection for ISI channel |
| 9 | 1) BER analysis in Rayleigh and Ricean Fading Channels  
   2) MAP symbol by symbol detection for ISI channels (Abend and Fritchman Detector)  
   3) Performance of MLSE for ISI channels |
| 10 | 1) Communication in Fading channels(13)  
   2) BER in rician and rayleigh fading channel  
   3) MAP Symbol-by-Symbol Detection for ISI channel |
| 11 | 1. Direct Sequence CDMA – spread spectrum principles – frequency hopping versus direct sequence, RAKE receiver for fading multipath channels synchronization in DS-CDMA systems  
   2. Reduced Complexity ML detection  
   3. MAP Symbol-by-Symbol Detection for ISI channel (Abend & Fritchman detector) |
| 12 | **Turbocoding & Decoding** |
| 13  | 1. BER in slowly fading Rayleigh channel  
    BER in Rician fading channel  
    2. *Fading Channel Communications – capacity of fading channels, multiple antenna systems, spatial diversity*  
    3. Multiuser Communications – Multiuser detection in DS-CDMA – Optimum receiver, decorrelating detection, successive interference cancellation |
|-----|----------------------------------------------------------------------------------|
| 14  | 1) *Adaptive Equalization.*  
     Under this we would be doing the following-  
     a) Reading up relevant literature on the topic  
     b) Simulating one (or more) of Least Mean Squares, Recursive Least Squares, Kalman Filtering in matlab.  
     c) If feasible, consider the possibility of implementing one of the algorithms on a DSP chip.  
    2) Turbo Equalisation.  
    3) *Spectral Characteristics of Linearly Modulated Signal with Memory.* (would be preferred!) |
| 15  | 1) *To work on adaptive equalizer design, and to test its performance on rayleigh fading channel.*  
    2) Direct Sequence CDMA – spread spectrum principles – frequency hopping versus direct sequence, RAKE receiver for fading multipath channels synchronization in DS-CDMA systems  
    3) Multiuser Communications – Multiuser detection in DS-CDMA – Optimum receiver, decorrelating detection, successive interference cancellation |
| 16 | 1) **Direct Sequence CDMA – spread spectrum principles – frequency hopping versus direct sequence, RAKE receiver for fading multipath channels**, synchronization in DS-CDMA systems  
2) Multiuser Communications – Multiuser detection in DS-CDMA – Optimum receiver, decorrelating detection, successive interference cancellation –  
3) Adaptive Equalisation (Least Mean Squares, Recursive Least Squares, Kalman Filtering), blind equalization (Constant modulus Algorithm and Bussgang techniques) |
| 17 | 1. BER in slowly fading Rayleigh channels and Rician fading channels.  
3. **Direct sequence CDMA- spread spectrum principles.** |
| 18 | **Open loop MIMO space-time codes** |
| 19 | **Closed loop MIMO space-time codes** |
| 20 | **Diversity gain and Multiplexing gain tradeoff** |
| 21 | **Multiple Antenna Transmission Schemes** |
| 22 | **Multi-carrier Modulation (OFDM)** |