**Unit-III: Wireless Transceivers**

**Session -1** Wirelwss Communication link 3.8.13, 6th period

Introduction: Presentation

Remember by keywords:

* Modulation
* Demodulation
* Coding
* decoding
* destination

Presentation : Slides

**Conclusion:**

**Recall by keywords**

1. Define modulation.

Modulation may be defined as the process by which some parameters of a high frequency signal termed as carried, is varied in accordance with the signal to be transmitted.

2. What is demodulation?

Demodulation or detection is the process of recovering the original modulating signal from a modulated wave.

3. Write the advantages of digital over analog modulation?

(i) Greater noise immunity.(ii) Robustness to channel impairments

(iii) Easier multiplexing of various forms of information.(iv) Greater security.

4. What are the digital modulation techniques are available?

Digital modulation techniques are 1. Amplitude shift keying (ASK)

2. Frequency shift keying (FSK) 3. Phase shift keying (PSK)

5. Write a short note on

(a) Amplitude shift keying (ASK)-If amplitude of the carrier is varied depending on the incoming digital signal, then it is called amplitude shift keying (ASK)

(b) Frequency shift keying (FSK)-If the frequency of the sinusoidal carrier varied depending on the incoming digital signal, then it is called frequency shift keying (FSK).

(c) Phase shift keying (PSK)-If phase of the carried is varied depending on the input digital signal, then it is called phase shift keying (PSK)

**Session -2 BPSK,QPSK–Modulation and demodulation 5.8.13, 4th period**

 Recap: By keywords

* Phase modulation
* Phase shift keying
* Frequency modulation

Short seminar: PSK modulation

Presentation: Slides

[www.youtube.com/watch?v=vXnOScHEWQQ](http://www.youtube.com/watch?v=vXnOScHEWQQ)

vada.skku.ac.kr/ClassInfo/digital-com2000/.../digital-modulation.ppt

**Conclusion:** Recall by words

 Bit rate, symbol rate, error probability

1. Define baud rate.

Speed at which symbols (signals) are transmitted in a digital communications system.

Simply no. of symbols/second.

2. Define bit rate.

Speed at which data (Bits) is transmitted in a digital communication system. Simply

no. of bits/second.

3. What is QAM?

At high bit rates, a combination of ASK and PSK is employed in order to minimize the errors in the received data. This method is known as “quadrature amplitude modulation”.

4. Define QPSK.

QPSK is a multilevel modulation in which four phase shifts are used for representing four different symbols.

5. Define linear modulation?

In linear modulation techniques, the amplitude of the transmitted (carrier) signal varies with the modulating digital signal.

6.Differentiate linear, non-linear modulation.

|  |  |
| --- | --- |
| linear modulation | nonlinear modulation |
| In the linear modulation the amplitude of the carrier is not constant, regardless of the variation in the modulating signals | In the non linear modulation the amplitude of the carrier is constant, regardless of the variation in the modulating signals.Non-linear modulations may have either linear or constant envelops depending on whether or not the base band waveform is pulse shaped. |
| Merits:(i) Bandwidth efficient.(ii) Very attractive for use in wireless communication systems and(iii) Accommodate more and more users within a limited spectrum.  | (i) Power efficient class C amplifiers can be used without introducing Degradation in the spectrum occupancy of the transmitted signal.(ii) Low out of band radiation of the order of -60dB to -70 dB can be achieved.(iii) Limiter-discriminator detection can be used, which simplifies receiver design and provides high immunity against random FM noise and Signal fluctuations due to Rayleigh fading. |
| Demerits:poor power efficient examples of linear modulation are(i) Pulse shaped QPSK(ii) OQPSK (iii) \/4QPSK | (i) Constant envelope modulations, occupy a larger bandwidth than linear modulation schemes.(ii) In situations where bandwidth efficiency is more important than power efficiency, constant envelope modulation is not well-suited. Eg.,BPSK |

**Session -3 π/4 QPSK, offset QPSK- modulation and demodulation 6.8.13,4th**

**Remember by Keywords**

* Bit rate
* symbol rate
* Linear
* non-linear modulation

Short seminar: QPSK modulation

**Presentation: slides**

ae.hc.cust.edu.tw/new\_website/attachments/article/.../Lecture%207.**ppt**‎

faraday.ee.emu.edu.tr/ee569/Rappaport/wirelessSlidesCh06.**ppt**

[www.cse.ohio-state.edu/~anish/788Notes/Wireless\_Transmission.**ppt**](http://www.cse.ohio-state.edu/~anish/788Notes/Wireless_Transmission.ppt)

**Conclusion: questions**

1. **Why we go for offset QPSK?**
2. **Few words about OQPSK.**
3. **Differentiate QPSK AND** π/4 QPSK
4. **List the advantages of OQPSK.**

**Session -4 BFSK modulation and demodulation 8.8.13,5th period**

**Recap: keywords and short seminar**

* Frequency modulation
* FSK
* Coherent and non-coherent detection

**Content: Presentation by slides Generation of FSK**

mail.alquds.edu/~f2095/Communication%20Systems/Ch5a.**ppt**

feihu.eng.ua.edu/NSF\_TUES/**Modulation**.**ppt**

[www.youtube.com/watch?v=EeHu5EyxPrk](http://www.youtube.com/watch?v=EeHu5EyxPrk)

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**Conclusion: Recall by words**

* Generation
* detection technique
* Error propagation

**Session – 5 principle and operation of MSK 12.8.13,4th period**

**Introduction: Presentation with Video**

[**www.youtube.com/watch?v=ifgsouypc78feature=relmfu**](http://www.youtube.com/watch?v=ifgsouypc78feature=relmfu)

 **Presentation : by slides**

[www.ti.com/ww/cn/uprogram/share/**ppt**/c5000/21**modulation**\_v110.**ppt**](http://www.ti.com/ww/cn/uprogram/share/ppt/c5000/21modulation_v110.ppt)

xa.yimg.com/kq/groups/23381305/2114408970/name/**MSK**.**ppt**

**Conclusion: Keywords**

* BT Product
* Constant envelop

**Session -6 principle and operation of GMSK 13.8.13,4th period**

**Recap: Keywords**

* MSK
* FSK
* Constant envelop modulation

**Content: Presentation slides**

[www.ti.com/ww/cn/uprogram/share/**ppt**/c5000/21**modulation**\_v110.**ppt**](http://www.ti.com/ww/cn/uprogram/share/ppt/c5000/21modulation_v110.ppt)

www.radio-electronics.com › [RF topics](http://www.radio-electronics.com/info/rf-technology-design/)‎

**Session -7 power spectrum 16.8.13, 7th period**

**Recap: keywords**

* Spectrum
* Wireless spectrum limitations
* Power spectrum

**Presentation : Slides**

[www.federica.unina.it/ingegneria/**wireless**-networks/digital-schemes](http://www.federica.unina.it/ingegneria/wireless-networks/digital-schemes)

www.cyut.edu.tw/~yfahuang/huang/EX0387CH03.pdf‎

 **Conclusion : keywors**

* Bandwidth occupancy
* Power efficiency
* Bandwidth efficiency

**Session -8** QPSK, BFSK system error performance 17.8.13, 4th period

Content: Presentation using video clips

<http://www.youtube.com/watch?v=vtiup1w1c4E&feature=related>

Conclusion:

* **Remember by keywords**
* generation
* detection
* Error probability

**Session -9** MSK, GMSK system error performance analysis 17.8.13, 6th

Content: Presentation slides

<http://www.youtube.com/watch?v=PNMuf8twHqw&feature=related>

<http://www.youtube.com/watch?v=eehh0DXLv10&feature=relmfu>

Conclusion: Questions and answers

1. **Distinguish between MSK,GMSK**



2.Write the properties of QPSK.



3.Compare QPSK,MSK,FSK

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