

EE 115 Lecture Note 1

Introduction

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I. OVERVIEW OF COMMUNICATION SYSTEMS

A. Analog Systems

Major components of analog communication systems:

- 1) Information source: audio recorder, video recorder, other sensors of signals and data.
- 2) Modulator: It transforms the source signal into a form suitable for transmission over a channel.
- 3) Channel: radio channel (of main interest in this course), optical channel, acoustic channel.
- 4) Demodulator: It transforms the received signal (over the channel) back into a desired form.
- 5) Information destination: any desired location different from the source location.

B. Digital Systems

Major components of digital communication systems:

- 1) Digital information: digital forms of audio, video and other types of signals.
- 2) Channel encoder: It transforms a sequence of original information bits into another form of digital signal, the purpose of which is for the best reception at the destination.
- 3) Modulator
- 4) Channel
- 5) Demodulator
- 6) Channel decoder: Convert the received signal back into the original information bits.
- 7) Information destination.

C. Brief History

- 1) Primitive communication methods: using fires and smokes
- 2) The first radio communication system: Guglielmo Marconi in 1895.
- 3) The analog communication systems (such as radio and TV) prevailed till 1990.
- 4) The 2G of mobile communications is digital, which came after 1990.

- 5) The 3G of mobile networks came around 2000, which allows mobile messages over the Internet.
- 6) The 4G/LTE of mobile networks came around 2010, which allows mobile videos over the Internet.
- 7) The 5G has arrived since 2020, which allows more users per area, faster speed and shorter latency.

D. Technical Content of This Course

Introduction of principles of analog communication systems, including a number of modulation and demodulation methods.