

Introduction to communication circuits and technologies. Summary of fundamentals of information, signals classification and characteristics. Spectral representation of periodic, nonperiodic and random signals. Communication channel diagram. Analogue and discrete modulation of a harmonic carrier, impulse modulation. Modulators and demodulators. Multiplexing.

1. Introduction: Basic taxonomy - Information, message, signal, (tele)communication, transmission channel, transmission medium.
2. Summary of information theory in communication: Information, logarithmic measure of information, entropy, redundancy
3. Signal classification and characterization. Deterministic and random signals and their characterization. Signal spectra, transfer functions, time and frequency domains.
4. Transport media - metal cables, optical cables, radio channel, their characteristics and parameters. Base-band signals and motivation for signal modulation. Classification of modulation methods and carriers. Linear distortion, ISI.
5. Pulse analogue modulations: PAM, PWM, PPM, PFM. Signal generation and recovery.
6. Discrete pulse modulations, quantization: QPAM, DM, PCM. Noise, quantization noise, BER.
7. Continuous amplitude modulation of a harmonic carrier: full AM, DSB, SSB, SC. Characteristics, parameters, modulators, demodulators.
8. Continuous frequency (FM) and phase (PM) modulation of a harmonic carrier: FM to PM relation, single sinusoid modulation, band-pass modulation, parameters, AM to FM and PM comparison.
9. Phase and frequency modulators and demodulators. Carrier recovery. Receiver synchronization.
10. Harmonic carrier discrete modulations: amplitude mod. - ASK, frequency mod. - FSK, CPFSK, MSK, phase mod. - PSK, BPSK, QPSK, QAM.
11. Discrete modulators and demodulators. Parameters.
12. Multiplexing: FDM, TDM, WDM, CDM. TDM hierarchy, SDH, PDH.

J. Pearson	Basic Communication Technology
F. J. Taylor	Principle of Signals and Systems
J. Proakis	Digital Communication, 1996

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