

Unit 3 - Week-0

Course outline

How does an NPTEL online course work?

Week-0

Quiz : Assignment-0

Week 1-Basic tools for communication, Fourier Series/Transform, Properties, Parsevals Relation, Properties of Fourier Transform, LTI Systems

Week 2- Cross- and Auto-correlation, (ESD), Introduction to Amplitude Modulation (AM), Spectrum of AM, Envelope Detection, Power Efficiency, (DSB-SC) Modulation and Demodulation

Week-3- Power Efficiency, (DSB-SC) Modulation and Demodulation, Carrier Phase Offset Example for (DSB-SC), Costas Receiver

Week-4 Quadrature Carrier Multiplexing (QCM) and Demodulation of QCM signals, Single Sideband Modulation (SSB), Hilbert Transform

Week-5 Generation of SSB , Complex pre-envelope of QCM, VSB , Introduction to AM

Week-6 Narrowband FM Generation, Spectrum of FM Signals, Carson's Rule for FM Bandwidth, Narrowband FM Generation, FM Demodulation, Introduction to Sampling, Spectrum of Sampled Signal, Aliasing, Nyquist Criterion

Week 7- Signal Reconstruction from Sampled Signal ,Introduction to Pulse Amplitude Modulation, Spectrum of PAM Signal and Reconstruction, Quantization, Uniform Quantizers – Midrise and Midtread, Quantization noise, Lloyd Max Quantization Algorithm, Non-uniform Quantizers

Week 8- Delta Modulation, Differential Pulse Code Modulation, Frequency Mixing and Translation in Communication Systems, Heterodyne and Super Heterodyne Receivers, Frequency Division Multiplexing, Time Division Multiplexing, T1 TDM System: Case Study

Week 9 - Basics of Probability, Conditional Probability, Independent Events - Mary-PAM Example, Independent Events-Block Transmission, Independent Events-Multiantenna Fading

Text Transcripts

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Week 10- Bayes Theorem, Maximum Aposteriori Probability (MAP) Receiver, Random Variables and PDF, Power of Fading Wireless Channel, Mean & Variance of Random Variables and Application:Average & RMS Delay Spread

Week 11 - Transformation of Random Variables, Gaussian Random Variable ,Special Case: IID Gaussian Random Variables, Application: Uniform Linear Arrays, Random Processes and (WSS) and WSS Exampl

Week 12- Power Spectral Density(PSD) for WSS Random Process, PSD Application in Wireless, WSS Random Process Through LTI System, Special Random Processes and Gaussian Process Through LTI System

Assignment-0

The due date for submitting this assignment has passed.
As per our records you have not submitted this assignment.

Due on 2020-01-27, 23:59 IST.

1) The carrier frequency of the signal $\sin(1000\pi t)\sin(\pi 10^7 t)$ is

1 point

- 1 KHz
 500 KHz
 10 MHz
 5 MHz

No, the answer is incorrect.
Score: 0

Accepted Answers:
5 MHz

2) The signal $x(t) = \frac{1}{\sqrt{1+t^2}}$ for $-\infty < t < \infty$ is

1 point

- A power signal
 An Energy signal
 A periodic signal
 Digital signal

No, the answer is incorrect.
Score: 0

Accepted Answers:
An Energy signal

3) The Fourier transform of the signal $\text{sinc}(1000t) = \frac{\sin(1000\pi t)}{1000\pi}$ is

1 point

- $\frac{1}{1000}$ for $|f| \leq 1000$
 $\frac{1}{1000}$ for $|f| \leq 500$
 1 for $|f| \leq 1000$
 1 for $|f| \leq 500$

No, the answer is incorrect.
Score: 0

Accepted Answers:
 $\frac{1}{1000}$ for $|f| \leq 500$

4) The complex exponential Fourier series expansion of a signal $x(t)$, of the form $x(t) = \sum_{k=-\infty}^{\infty} c_k e^{jk\omega_0 t}$, is best suited for the analysis of

1 point

- Continuous time periodic signals
 Discrete time periodic signals
 Discrete time signals
 Continuous time signals

No, the answer is incorrect.
Score: 0

Accepted Answers:
Continuous time periodic signals

5) The Fourier transform of $\cos(2\pi f_c t)$ is

1 point

- $\delta(f - f_c)$
 $-\frac{j}{2}\delta(f - f_c) + \frac{j}{2}\delta(f + f_c)$
 $\frac{1}{2}\delta(f - f_c) + \frac{1}{2}\delta(f + f_c)$
 $\frac{1}{2j}\delta(f - f_c) + \frac{1}{2j}\delta(f + f_c)$

No, the answer is incorrect.
Score: 0

Accepted Answers:
 $\frac{1}{2}\delta(f - f_c) + \frac{1}{2}\delta(f + f_c)$

6) Consider the amplitude modulation system with output $y(t) = x(t)\cos(2\pi f_c t)$. This system is

1 point

- Only Linear
 Only Time-Invariant
 Linear Time-Invariant
 Only satisfies homogeneity property

No, the answer is incorrect.
Score: 0

Accepted Answers:
Only Linear

7) Let the Fourier transform of signal $y(t)$ be denoted by $Y(f)$. The Fourier transform of $ty(t)$ is

1 point

- $\frac{j}{2\pi} \frac{d}{df} Y(f)$
 $-\frac{d}{df} Y(f)$
 $j2\pi f Y(f)$
 $f Y(f)$

No, the answer is incorrect.
Score: 0

Accepted Answers:
 $\frac{j}{2\pi} \frac{d}{df} Y(f)$

8) The 4G wireless standard is known as

1 point

- GSM
 LTE
 WCDMA
 HSDPA

No, the answer is incorrect.
Score: 0

Accepted Answers:
LTE

9) The technology used in current 3G wireless networks is

1 point

- Orthogonal Frequency Division for Multiple Access (OFDMA)
 Time Division for Multiple Access (TDMA)
 Code Division for Multiple Access (CDMA)
 Generalized Packet Radio Service (GPRS)

No, the answer is incorrect.
Score: 0

Accepted Answers:
Code Division for Multiple Access (CDMA)

10) The noise in a communication system is typically modeled as

1 point

- Gaussian noise
 Exponential noise
 Laplacian noise
 Uniform noise

No, the answer is incorrect.
Score: 0

Accepted Answers:
Gaussian noise