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Courses » Principles of Digital Communications

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## Unit 7 - Week 6

### Course outline

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Week 6

- Lecture 29 : Companded Quantization-I
- Lecture 30 : Companded Quantization-II
- Lecture 31 : Differential Pulse Code Modulation DPCM-I
- Lecture 32 : DPCM-II (Linear Prediction)
- Lecture 33 : Delta Modulation
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### Assignment 6

The due date for submitting this assignment has passed.

As per our records you have not submitted this assignment. **Due on 2018-09-12, 23:59 IST.**

1) A sinusoidal signal of frequency  $f_o$  and amplitude  $A$ , is sampled at frequency  $10f_o$ . It is **1 point** then operated upon by a one-step linear predictor with a single coefficient  $w_1$ . The value of  $w_1$  that maximizes the prediction error variance is

$\cos(0.1)$

$\cos(0.2)$

$\cos(0.05)$

$\cos(0.02)$

**No, the answer is incorrect.**

**Score: 0**

**Accepted Answers:**

$\cos(0.1)$

2) In Question-1, the minimum value of the prediction error variance is

**1 point**

$\frac{A^2}{2} \cos^2(0.1)$

$\frac{A^2}{2} \sin^2(0.1)$

$A^2 \cos^2(0.05)$

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3) A delta modulation system has a maximum bandwidth constraint of 5 kHz for its input analog signals. Its sampling frequency is 50 kHz. A sinusoid of amplitude 1 V and frequency 1 kHz is input to the system. The value of the step size (in volts) which minimizes slope overload is

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: Range) 0.1,0.2

1 point

4) A linear delta modulation system uses a step size of 0.1V and has bandwidth of 3kHz. The sampling frequency is 10 times the Nyquist rate. The maximum amplitude (in volts) for sinusoidal signal of 1kHz frequency, that can be processed without slope overload distortion is

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: Range) 0.9,1

1 point

5) A square root compander with the characteristic  $z(x) = x_{max} \sqrt{\left| \frac{x}{x_{max}} \right| \text{sgn}(x)}, \left| \frac{x}{x_{max}} \right| \leq 1$  is deployed in conjunction with a 3-bit midrise uniform quantizer where the output of the quantizer varies in the range  $\pm 8.75V$ . For an input of 0.6V the magnitude of the quantization error in volts with companding is

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: Range) 0.4,0.5

1 point

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