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9.5 QUIZ QUESTION 1 (1/1 point)

Consider a noisy communication channel that takes binary input, IN, and produces an output given by $y = r + v$ where

a. $r = 0.4 \text{ V}$ if IN = 0.

b. $r = 0.8 \text{ V}$ if IN = 1.

c. v is a Gaussian random variable with zero mean and variance $\sigma^2 = 0.01 \text{ V}^2$.

What is the value of the signal to noise ratio in decibles?

Please key in the decimal value of your answer to the nearest hundreth in the box provided below.

6.02

6.02

Answer: 6.0206
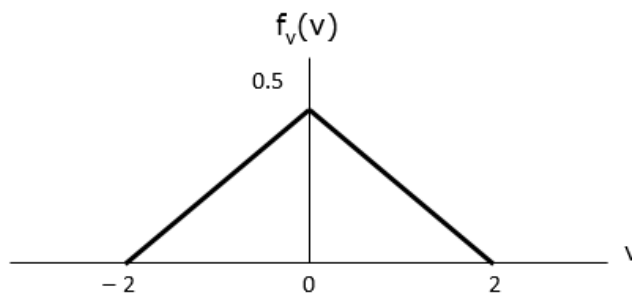
EXPLANATION

$$SNR = 10 * log_{10}(\frac{(r_{max} - r_{min})^2}{4\sigma^2}) = 10 * log_{10}(\frac{(0.8 - 0.4)^2}{4*0.01}) = 6.02$$

Check   Save   Hide Answer   *You have used 1 of 3 submissions*

9.5 QUIZ QUESTION 2 (1/1 point)

Suppose that the noise, v, in a communication channel has the probability density function shown below.

$$f_v(v) = 0.5 - 0.25|v| \text{ if } -2 \le v \le 2 \text{ and } 0 \text{ otherwise}$$

What is the probability that v is between 0.4 and 1? Enter the probability as a decimal number between 0 and 1 (100%).

Hint: No need to integrate. The area of a trapezoid is $\frac{a+b}{2} \cdot h$ where a and b are the two bases and h is the height.

Please key in the decimal value of your answer to the nearest thousandth in the box provided below.
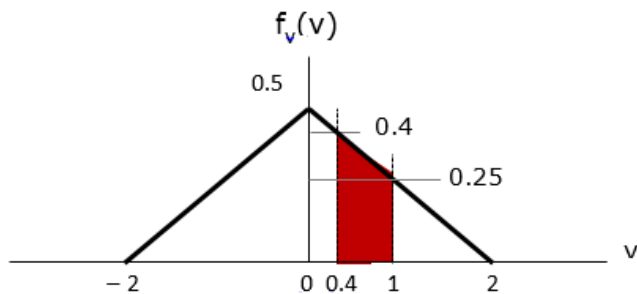
0.195

0.195

Answer: 0.195

EXPLANATION

Since the curve defines a trapezoid as below.

The area of the shaded region is $\frac{f_v(0.4)+f_v(1)}{2} (1 - 0.4)$.

Since $f_v(0.4) = 0.5 - 0.25|0.4| = 0.4$ and $f_v(1) = 0.5 - 0.25|1| = 0.25$,

$$P[0.4 < v < 1.0] = \frac{0.4+0.25}{2} \cdot 0.6 = 0.195$$

Check   Save   Hide Answer   *You have used 1 of 3 submissions*

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