7.2 QUIZ QUESTION 1 (1/1 point)

Suppose we have a linear time invariant channel whose step response is given by

$$s(n) = \frac{2}{3} * (1 - (\frac{5}{8})^{n+1})u(n)$$

where $u(n)$ is the unit step function.

Determine the equation for the equalizer for this channel, by expressing the equalized waveform x(n) as a function of the received waveform y(n).

Please key in your answer in the box provided below with the correct coefficients. Use decimals, not fractions in your answer. For example, your answer should look something like: x(n)=1.6*y(n)-3.1*y(n-1)

x(n)=4*y(n)-2.5*y(n-1)

EXPLANATION

The step response

$$s(n) = \frac{2}{3} * (1 - (\frac{5}{8})^{n+1})u(n) \rightarrow a = \frac{5}{8}, k = \frac{2}{3}$$

The equivalent recursive model:

$$y(n) = a * y(n-1) + (1-a) * k * x(n) \rightarrow y(n) = \frac{5}{8} * y(n-1) + \frac{1}{4} * x(n)$$

Invert the recursive model:

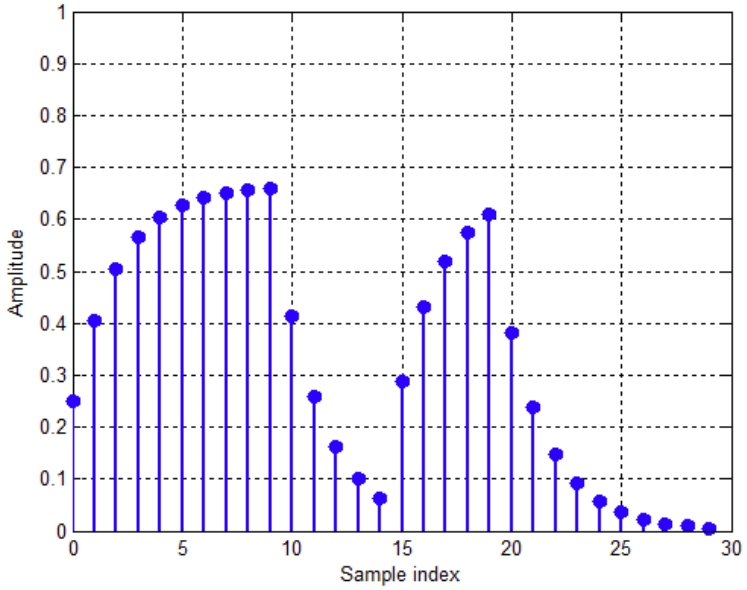
$$\rightarrow x(n) = 4 * y(n) - 2.5 * y(n-1)$$

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

7.2 QUIZ QUESTION 2 (1/1 point)

The following figure plots a waveform received at the output of this channel introduced above. Estimate the value of the input at index 15, $x(15)$.

Help



Please key in the numerical value of your answer in the box provided below. The answer is correct if it is within 0.1 of the expected answer.

1.05

1.05

Answer: 1.0

EXPLANATION

By applying the equalizer obtained in Q1:

$x(15) = 4 * y(15) - 2.5 * y(14)$

Referring to the figure, $y(15) \approx 0.3, y(14) \approx 0.08$

$\rightarrow x(15) \approx 4 * 0.3 - 2.5 * 0.08 = 1$

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

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