



► Pre-course Materials

► Topic 1: Course Overview

► Topic 2: Lossless Source Coding: Hamming Codes

► Topic 3: The Frequency Domain

► Topic 4: Lossy Source Coding

▼ Topic 5: Filters and the Frequency Response

5.1 Channels as Filters

5.2 Frequency Response

Week 3 Quiz due Nov 16, 2015 at 15:30 UTC

5.3 Filter Examples

Week 3 Quiz due Nov 16, 2015 at 15:30 UTC

5.4 Frequency Response of the IR Channel

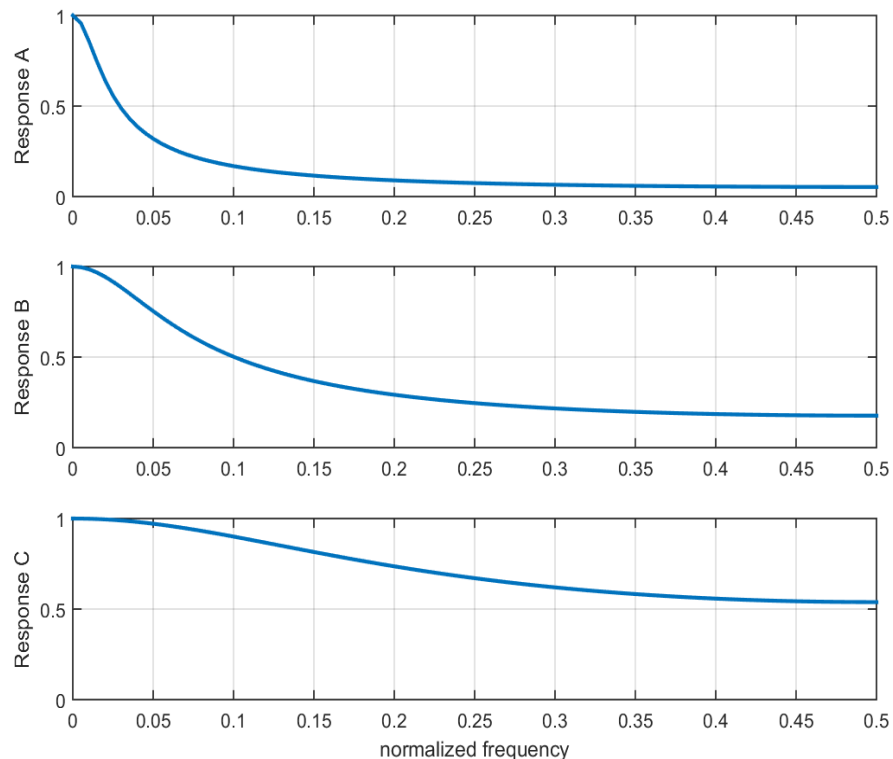
Week 3 Quiz due Nov 16, 2015 at 15:30 UTC

Consider three linear time invariant channels with step responses given by

$$s(n) = (1 - a^{n+1})u(n)$$

$$\text{where } a = \begin{cases} 0.9 & \text{for channel 1} \\ 0.3 & \text{for channel 2} \\ 0.7 & \text{for channel 3} \end{cases}$$

The frequency responses of these three channels are shown in random order below.



5.4 QUIZ QUESTION 1 (1/1 point)


Which frequency response corresponds to channel 3?

☐ frequency response A

5.5 Lab 3 - Frequency Response

Lab due Nov 16, 2015
at 15:30 UTC 

- ▶ Topic 6: The Discrete Fourier Transform
- ▶ MATLAB download and tutorials
- ▶ MATLAB Sandbox

☒ frequency response B 

☐ frequency response C

EXPLANATION

This channel has a low pass characteristic, where the cutoff frequency varies monotonically with a . The channel 3 has an intermediate value of a between that of channels 1 and 2. Thus, the cutoff frequency should achieve an intermediate value. This corresponds to Response B.

You have used 1 of 2 submissions

5.4 QUIZ QUESTION 2 (1/1 point)

Which frequency response corresponds to channel 1?

☒ frequency response A 

☐ frequency response B

☐ frequency response C

EXPLANATION

This channel has a low pass characteristic, where the cutoff frequency varies monotonically with a . The channel 1 has a large a , meaning that the step response changes very slowly. This tends to strongly block high frequencies. If we examine the frequency response for large frequencies, Response A has the smallest values.

You have used 1 of 1 submissions

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