

Active Noise Control of Speech in Headphones

using Linear Prediction

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Acoustics and Audio Technology - Fall 2016
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Agenda

Active Noise Control of
Speech in
Headphones using
Linear Prediction
Group 761

Introduction

What is Active Noise
Control (ANC)
Present consumer
headphones

Methods

Adaptive Filtered-x least
mean squares FIR
algorithm
Wiener filtering

Results

Simulation

Discussion

Computation

Conclusion

Listen

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Introduction

What is Active Noise Control (ANC)
Present consumer headphones

Methods

Adaptive Filtered-x least mean squares FIR algorithm
Wiener filtering

Results

Simulation

Discussion

Computation

Conclusion

Listen

Introduction

What is ANC

Active Noise Control of
Speech in
Headphones using
Linear Prediction

Group 761

Introduction

What is Active Noise
Control (ANC)

Present consumer
headphones

Methods

Adaptive Filtered-x least
mean squares FIR
algorithm

Wiener filtering

Results

Simulation

Discussion

Computation

Conclusion

Listen

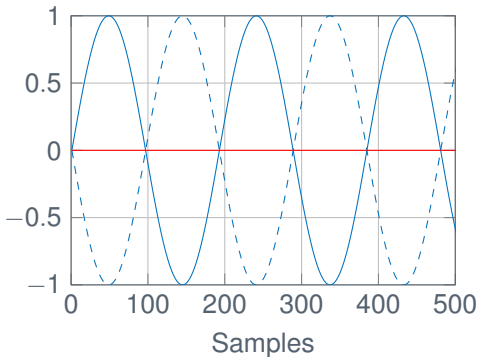
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2

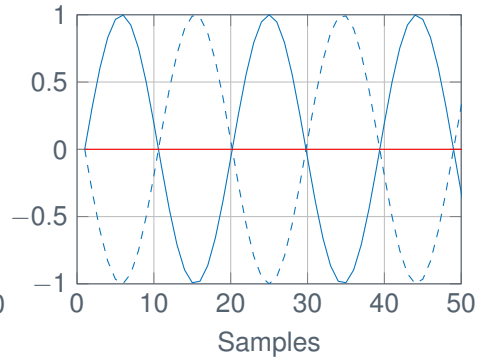
► The basic theory of ANC

- 250 Hz
- 2500 Hz

Amplitude



- Original signal
- - Counterphase signal
- Error



7

Introduction

How does ANC work

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Introduction

What is Active Noise Control (ANC)

Present consumer headphones

Methods

Adaptive Filtered-x least mean squares FIR algorithm

Wiener filtering

Results

Simulation

Discussion

Computation

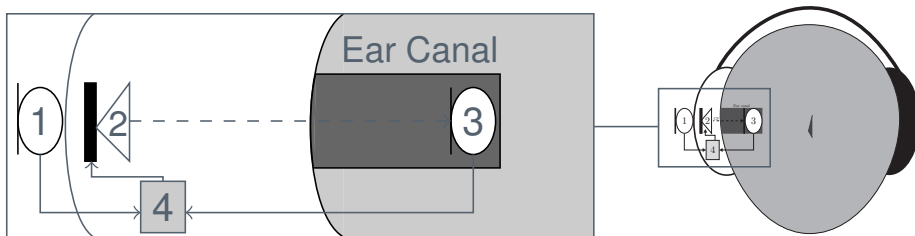
Conclusion

Listen

3

► Feedforward system

- 1: Reference microphone
- 2: Headphone loudspeaker
- 3: Error microphone
- 4: Digital signal Processor (DSP)



7

Introduction

Problem of ANC

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Speech in
Headphones using
Linear Prediction

Group 761

Introduction

What is Active Noise
Control (ANC)

Present consumer
headphones

Methods

Adaptive Filtered-x least
mean squares FIR
algorithm

Wiener filtering

Results

Simulation

Discussion

Computation

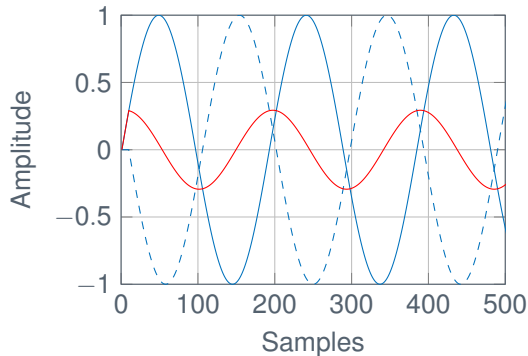
Conclusion

Listen

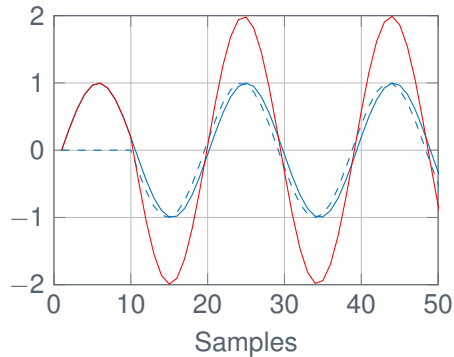
4

▶ Counter phase signal delayed 10 samples

- ▶ 250 Hz
- ▶ 2500 Hz



- Original signal
- - Counterphase signal
- Error



7



Introduction

Stationary vs non-stationary signals

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Speech in
Headphones using
Linear Prediction
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Introduction

What is Active Noise
Control (ANC)

Present consumer
headphones

Methods

Adaptive Filtered-x least
mean squares FIR
algorithm

Wiener filtering

Results

Simulation

Discussion

Computation

Conclusion

Listen

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5

► Conversion delay

7

Introduction

Present consumer headphones

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Speech in
Headphones using
Linear Prediction

Group 761

Introduction

What is Active Noise
Control (ANC)

Present consumer
headphones

6

Methods

Adaptive Filtered-x least
mean squares FIR
algorithm

Wiener filtering

Results

Simulation

Discussion

Computation

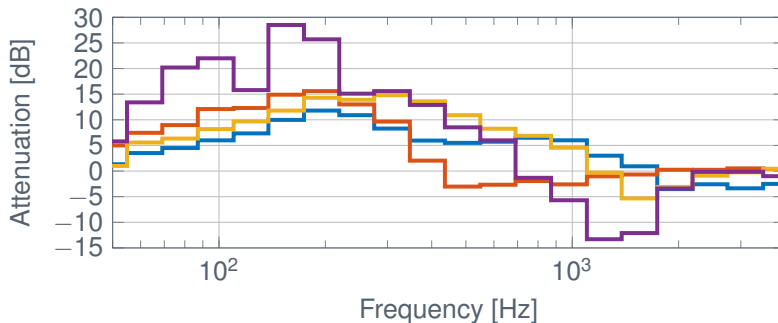
Conclusion

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► How well does the consumer headphones attenuate?

- Denon AH-GC20 2.200 kr (2016)
- Bose QC25 2.799 kr (2016)
- Bose QC15 2.696 kr (2011)
- B&O H8 3.495 kr (2016)





Introduction

A solution for the problem

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Group 761

Introduction

What is Active Noise
Control (ANC)

Present consumer
headphones

7

Methods

Adaptive Filtered-x least
mean squares FIR
algorithm

Wiener filtering

► Conversion delay

Results

Simulation

Discussion

Computation

Conclusion

Listen

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Mikkel is awesome!



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