**Assignment 3**

Submitted to Eng Mohamed Khaled

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**Table of contents:**

[1. Part One 3](#_Toc135635128)

[1.1 Gram-Schmidt Orthogonalization 3](#_Toc135635129)

[1.2 Signal Space Representation 4](#_Toc135635130)

[1.3 Signal Space Representation with adding AWGN 5](#_Toc135635131)

[1.4 Noise Effect on Signal Space 6](#_Toc135635132)

[2. Appendix A: Codes for Part One: 7](#_Toc135635133)

[A.1 Code for Gram-Schmidt Orthogonalization 7](#_Toc135635134)

[A.2 Code for Signal Space representation 7](#_Toc135635135)

[A.3 Code for plotting the bases functions 8](#_Toc135635136)

[A.4 Code for plotting the Signal space Representations 9](#_Toc135635137)

[A.5 Code for effect of noise on the Signal space Representations 10](#_Toc135635138)

**List of Figures**

[Figure 1 Φ1 VS time after using the GM\_Bases function 5](#_1fob9te)

[Figure 2 Φ2 VS time after using the GM\_Bases function 5](#_3znysh7)

[Figure 3 Signal Space representation of signals s1,s2 6](#_tyjcwt)

[Figure 4 Signal Space representation of signals s1,s2 with E/σ¬2 =10dB 7](#_1t3h5sf)

[Figure 5 Signal Space representation of signals s1,s2 with E/σ¬2 =0dB 7](#_4d34og8)

[Figure 6 Signal Space representation of signals s1,s2 with E/σ¬2 =-5dB 8](#_2s8eyo1)

# Part One

## 1.1 Gram-Schmidt Orthogonalization

[كلام بسيط]

A screenshot of a graph

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**Figure 1 Φ1 VS time after using the GM\_Bases function** **Figure 2 Φ2 VS time after using the GM\_Bases function**

## 1.2 Signal Space Representation

Here we represent the signals using the base functions.

A screenshot of a computer

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**Figure 3 Signal Space representation of signals s1,s2**

## 1.3 Signal Space Representation with adding AWGN

-the expected real points will be solid and the received will be hollow

**Case 1**:

A screen shot of a graph

Description automatically generated with medium confidence

**Figure 4 Signal Space representation of signals s1,s2 with E/σ¬2 =10dB**

**Case 2**:

A picture containing text, diagram, screenshot, plot

Description automatically generated

**Figure 5 Signal Space representation of signals s1,s2 with E/σ¬2 =0dB**

**Case 3**:

A screenshot of a graph

Description automatically generated with medium confidence

**Figure 6 Signal Space representation of signals s1,s2 with E/σ¬2 =-5dB**

## 1.4 Noise Effect on Signal Space

A screenshot of a computer program

Description automatically generated with low confidence

# Appendix A: Codes for Part One:

## A.1 Code for Gram-Schmidt Orthogonalization

A screen shot of a computer

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## A.2 Code for Signal Space representation

A screen shot of a computer program

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## A.3 Code for plotting the bases functions

A screen shot of a computer screen

Description automatically generated with low confidence

## A.4 Code for plotting the Signal space Representations

A screenshot of a computer program

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## A.5 Code for effect of noise on the Signal space Representations

A picture containing text, screenshot, software

Description automatically generated

A screen shot of a computer program

Description automatically generated with medium confidenceA screen shot of a computer program

Description automatically generated with low confidence