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| **EXPERIMENT REPORT** *of* *Digital Signal Processing* | | | |
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| ***TYPICAL DIGITAL SIGNALS: GENERATION AND ITS FREQUENCY ANALYSIS BY USING MATLAB*** | | | |
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| *November, 2015* | | | |

# Generation of Typical Signals

## Unit Sampling Sequence

EXAMPLE: Unit sampling signal, or also can be thought as a unit sampling sequence in digital signal processing, is very unique and fundamental. After an ideal sampling, we can simply treat any sampled signals as a linear combination of a set of shifted unit sampling sequence with different amplitude scalar.

### Signal Expression

EXAMPLE:



As shown in Eq, a unit sampling sequence  equals 1 only at 

### MATLAB Codes (*with Notes*)

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| % This is an EXAMPLE  clear; % Clear workspace  clc; % Clear message queue  k=0; % Shifted Time Index  N=50; % Total number of samples  delta=zeros(N); % Generate a N-length zero sequence  ………………………………………………………... |

### Simulation Results and Illustrations



## Unit Step Sequence

### Signal Expression

### MATLAB Codes (*with Notes*)

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### Simulation Results and Illustrations

## Real Exponential Sequence

### Signal Expression

### MATLAB Codes (*with Notes*)

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### Simulation Results and Illustrations

## Complex Exponential Sequence

### Signal Expression

### MATLAB Codes (*with Notes*)

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### Simulation Results and Illustrations

## Sinusoidal Sequence

### Signal Expression

### MATLAB Codes (*with Notes*)

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### Simulation Results and Illustrations

## Summary and Discussion

# Frequency Analysis

## Discrete Time Fourier Transform (DTFT)

### Concept of DTFT

### Signal Expression in Frequency Domain

### MATLAB Codes (*with Notes*)

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### Simulation Results and Illustration

## Discrete Fourier Transform (DFT)

### Concept of DFT

### MATLAB Codes (*with Notes and Different Signal Length*)

#### Unit Sampling Sequence

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#### Unit Step Sequence

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#### Real Exponential Sequence

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#### Complex Exponential Sequence

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#### Sinusoidal Sequence

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### Simulation Results and Illustrations (*with Different Signal Length*)

## Summary and Discussion

# Speech Signal Analysis

## MATLAB Codes (*with Notes*)

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## Simulation Results and Illustrations (*both Male and Female Speech Signals*)

## Summary and Discussion

# Additional Tasks

## Plot the Complex Exponential Sequence in 3-D

### MATLAB Codes (*with Notes*)

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### Simulation Results and Illustration (*with Different*)

### Summary and Discussion

## Realize the DFT

### MATLAB Codes (*with Notes*)

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### Simulation Results and Illustrations

### Summary and Discussion

## Compare the performance of DFT realized above and FFT

### MATLAB Codes (*with Notes*)

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### Simulation Results and Illustrations

### Summary and Discussion

# Experience and Overview