SpectraQuest, Inc.

Signal Processing and Simulation

Level I

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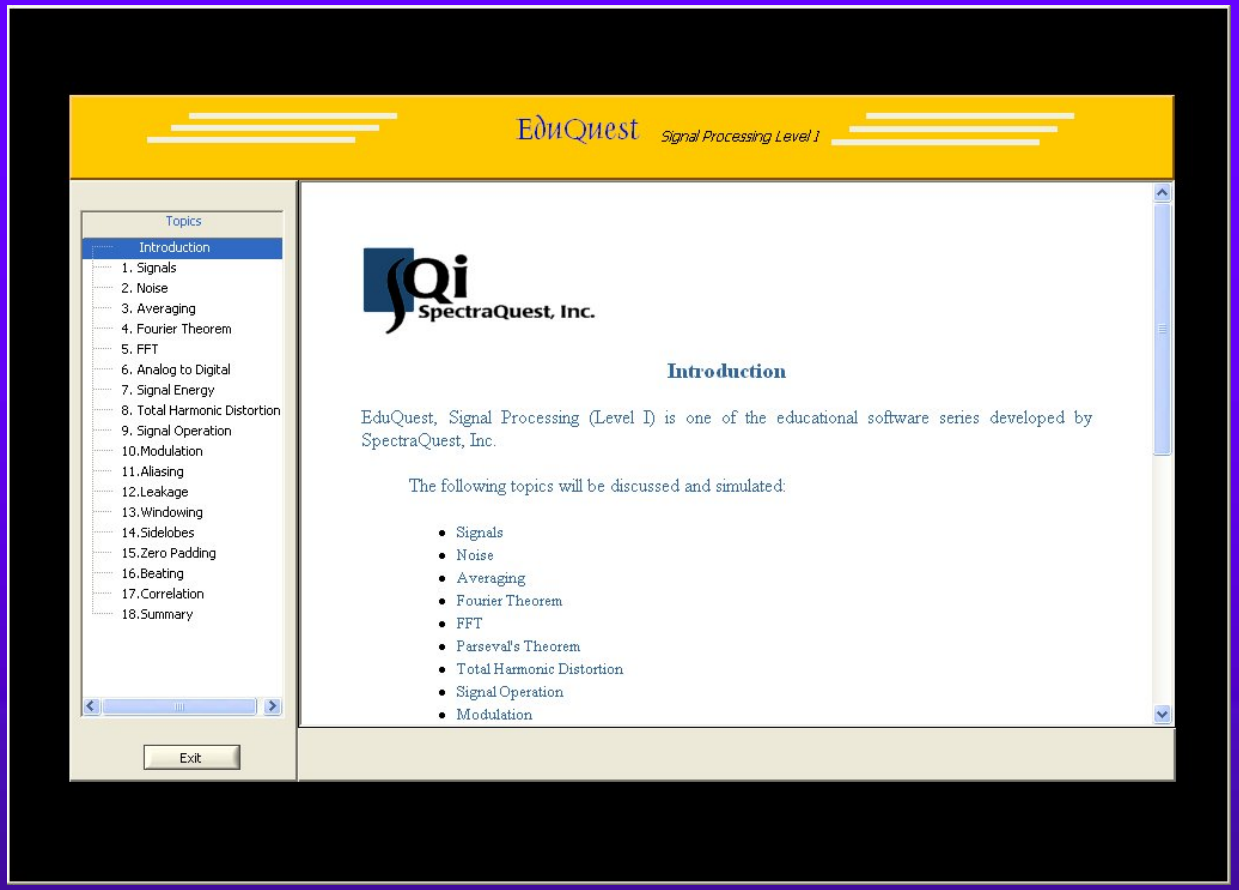
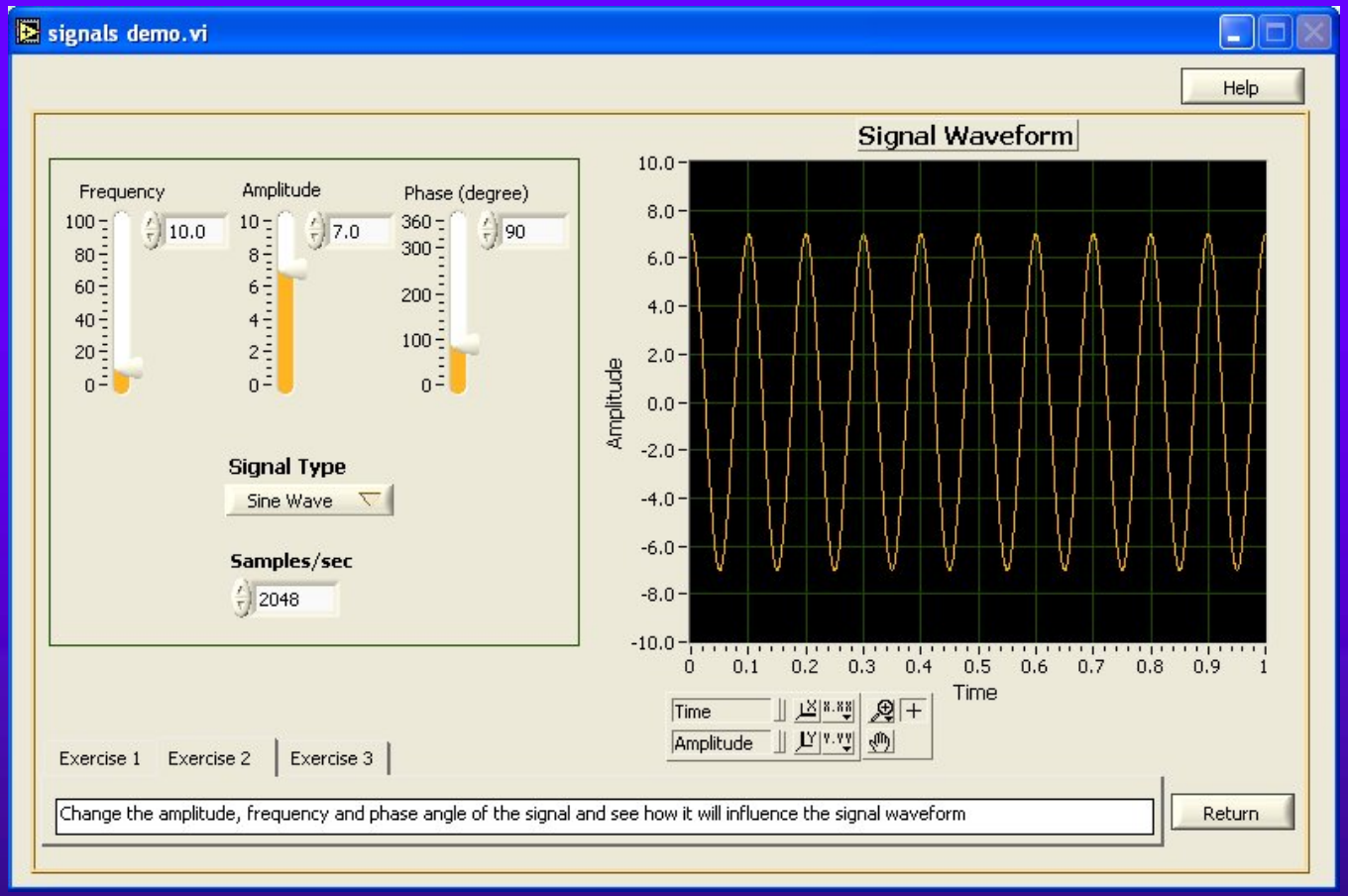
Product Highlights



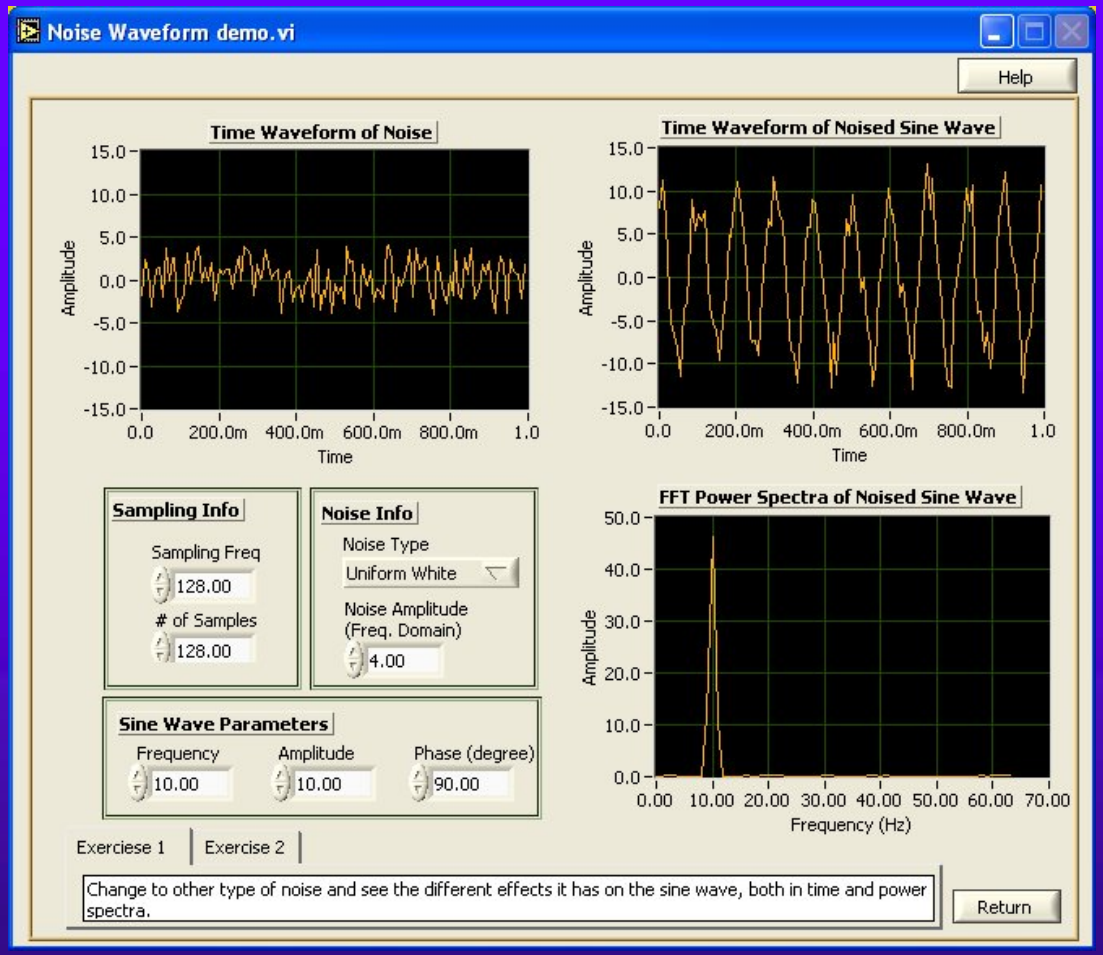
- **Features**
  1. 17 most common topics you will encounter in the real world.
  2. Theory plus simulation will give you a much better understanding.
  3. Exercises after each topic will let you know you really learned.

Signal Simulation



- **What you will learn?**
  1. Concept of signals.
  2. Classification of signals.
  3. Signal generation.

Noise Simulation

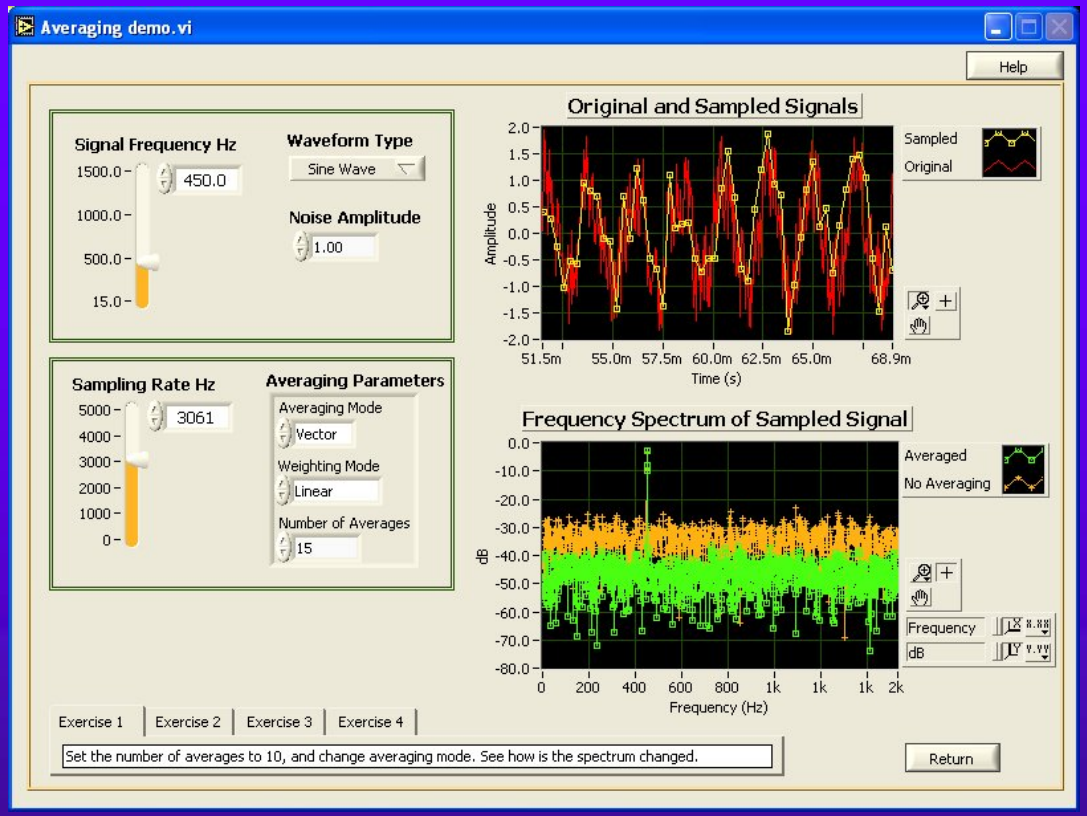


- **What you will learn?**

  1.Where noise comes from?

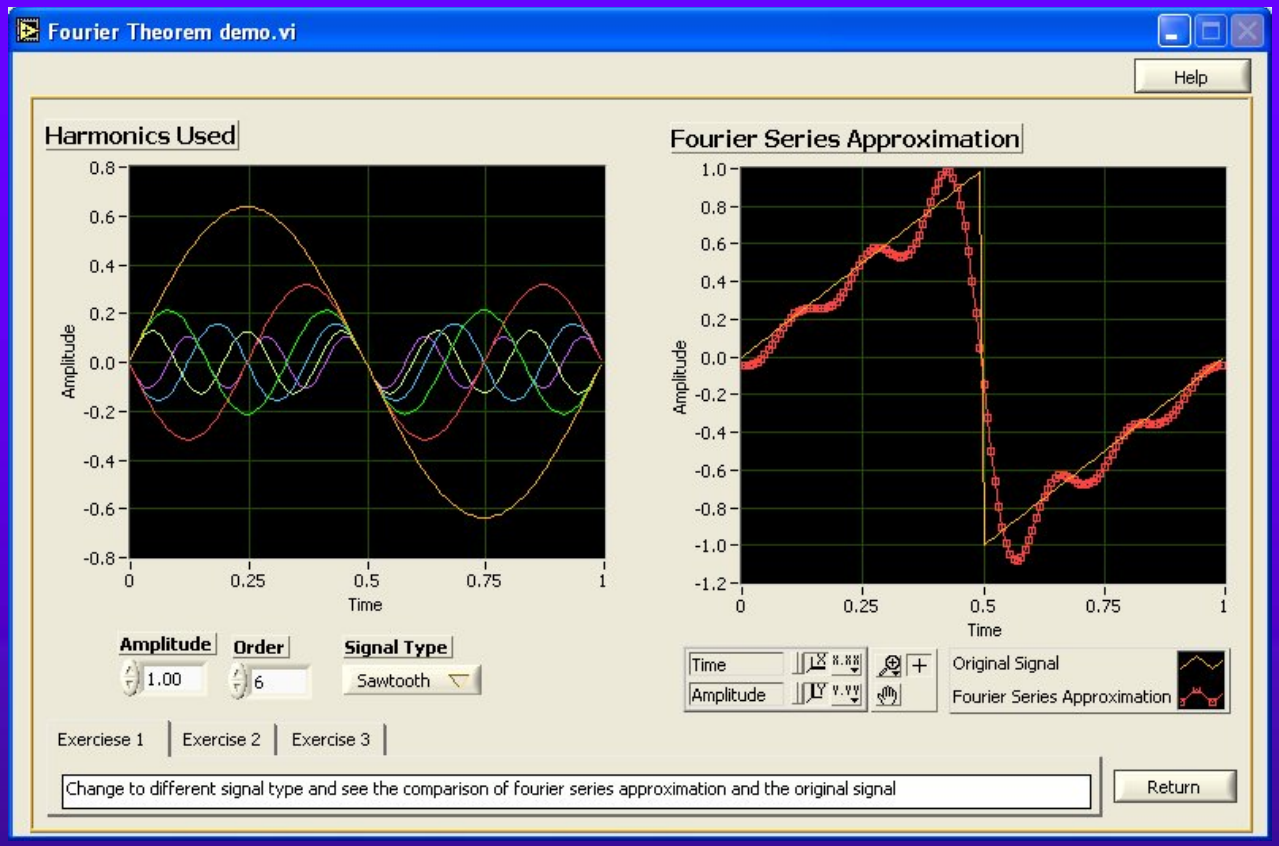
  2. Noise Classification

Averaging Simulation



- What you will learn?
  1. Averaging is a useful tool to reduce noise level.
  2. Commonly used averaging method.

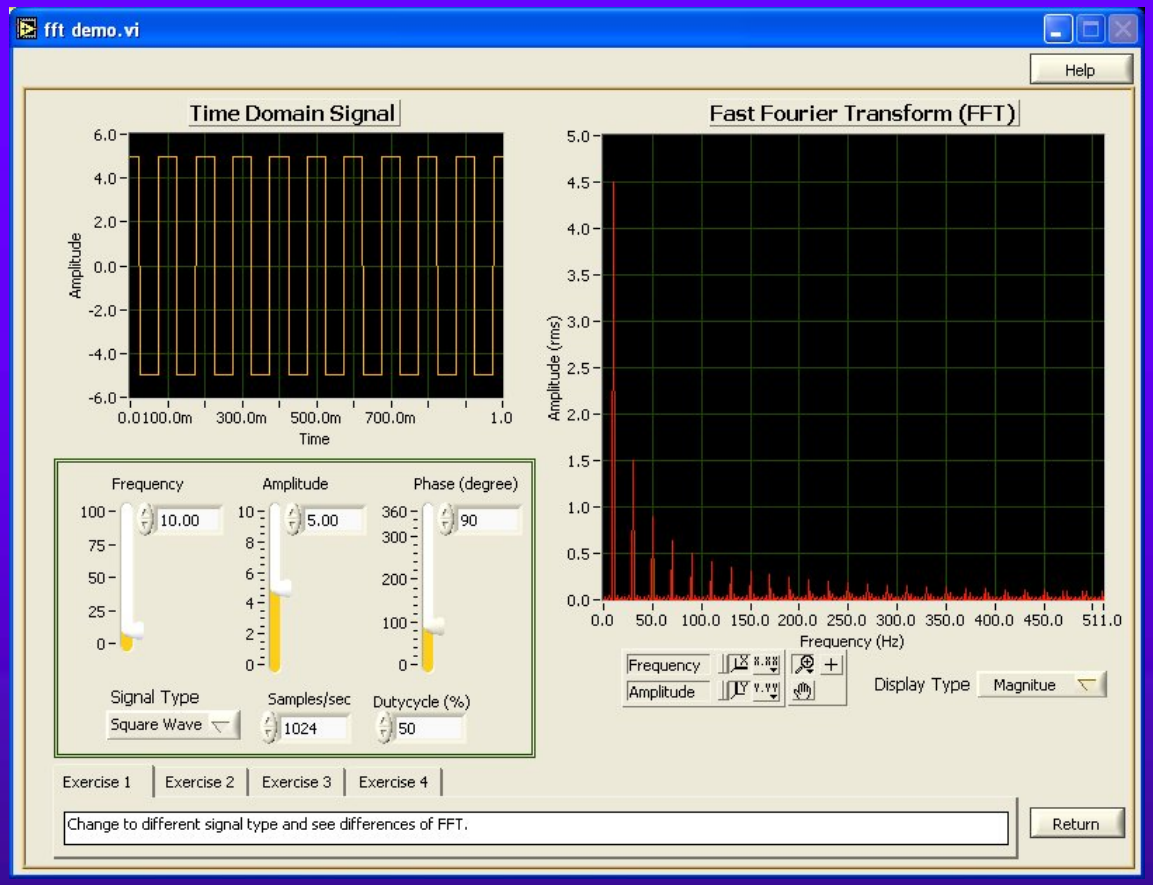
Fourier Theorem Simulation



- **What you will learn?**

  1. Importance of Fourier Theorem.
  2. Any periodic signal can be expressed as a superposition of sinusoidal components.

Fast Fourier Transform Simulation



- **What you will learn?**

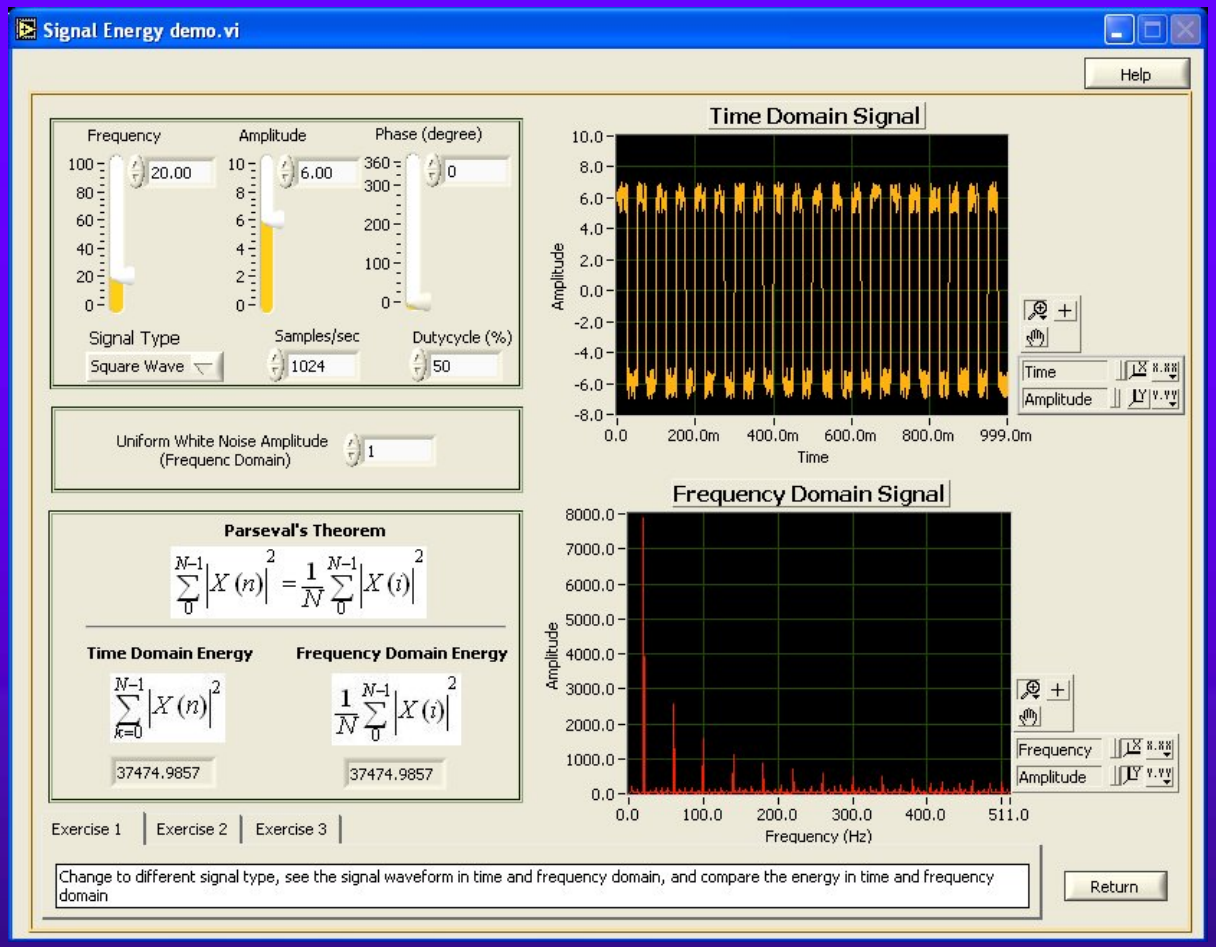
1. Efficient Discrete Fourier Transform calculation algorithm--Fast Fourier Transform
2. Several important issues of using FFT
3. The concepts of magnitude and phase information of a signal

Analog to Digital Conversion

- What you will learn?

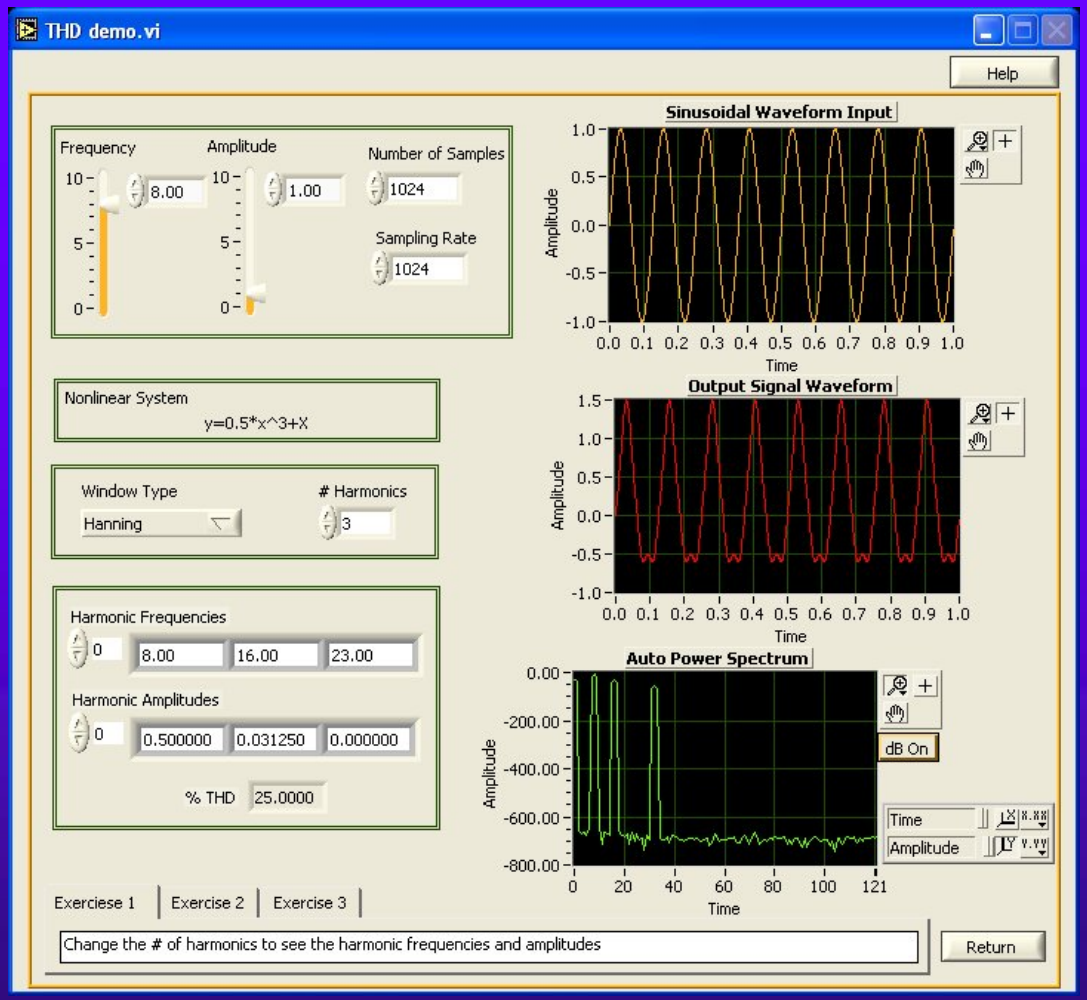
1. Concepts of quantization and quantization level.
2. Difference of discrete signal and digital signal.
3. Effect of quantization.
4. Average power of quantization error.

Signal Energy



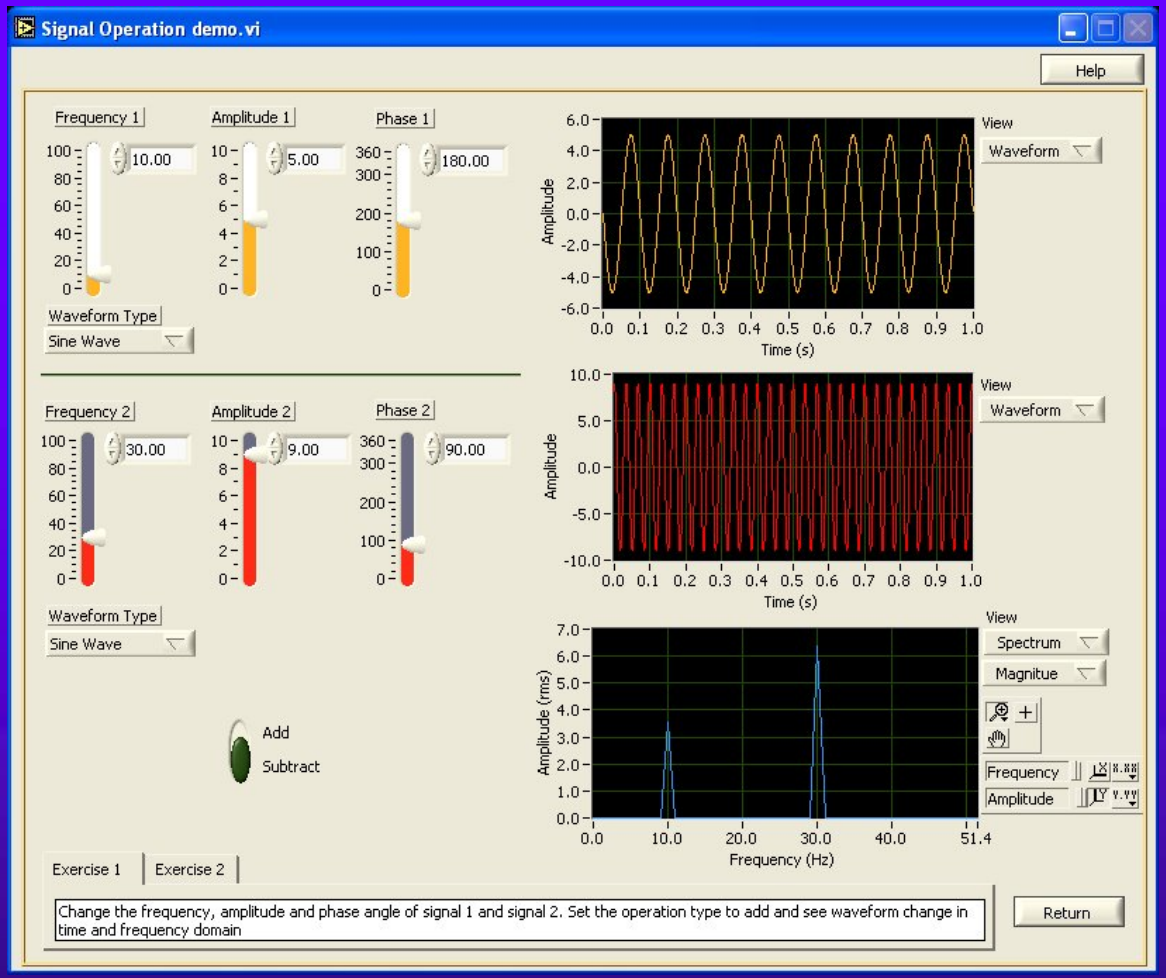
- **What you will learn?**
  1. Concept of signal energy in time and frequency domain.
  2. Parseval's Theorem.

Total Harmonic Distortion



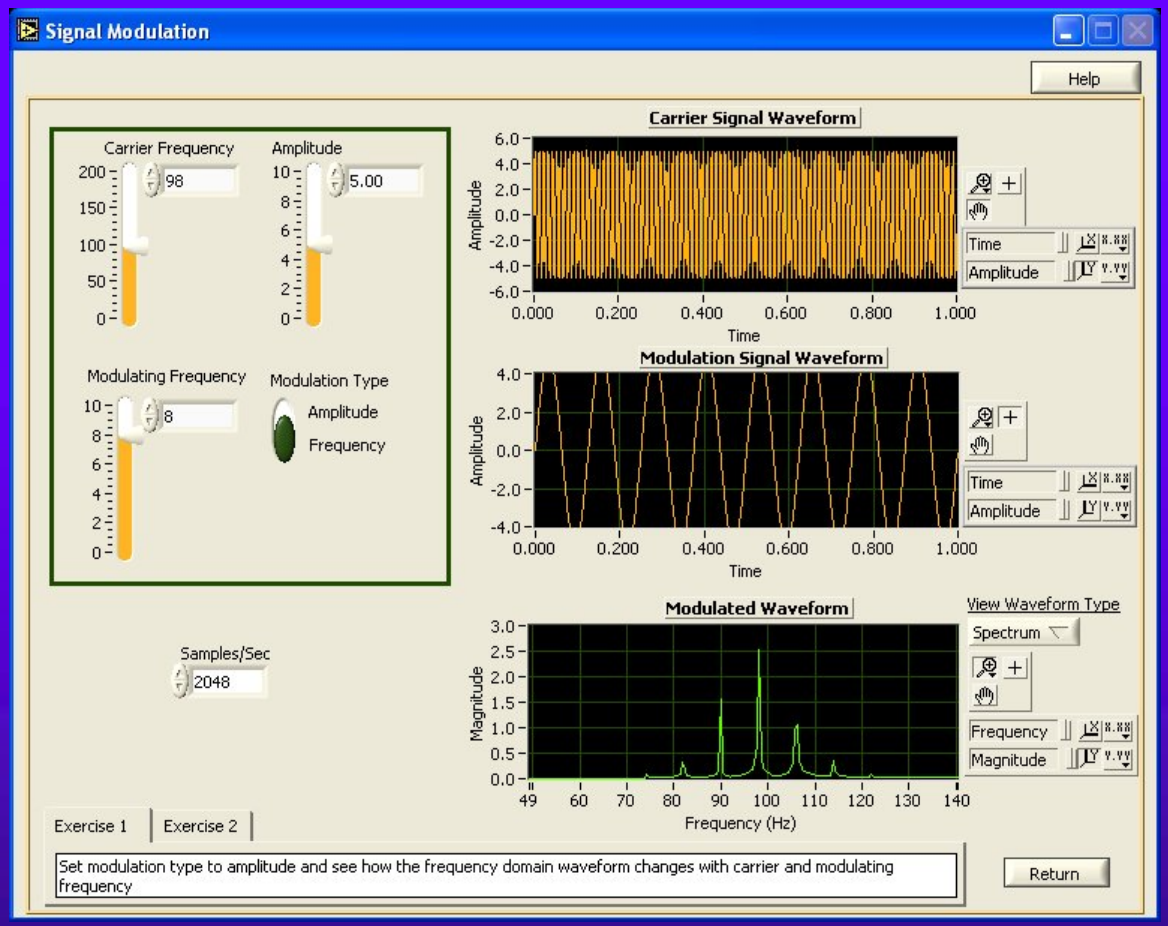
- **What you will learn?**
  1. Concept of Total Harmonic Distortion.
  2. Measurement of distortion

Signal Operation



- **What you will learn?**
  1. Common used signal operation method, scaling, delay and addition.
  2. Concepts of Filtering.
  3. Concepts of Modulation and Demodulation.

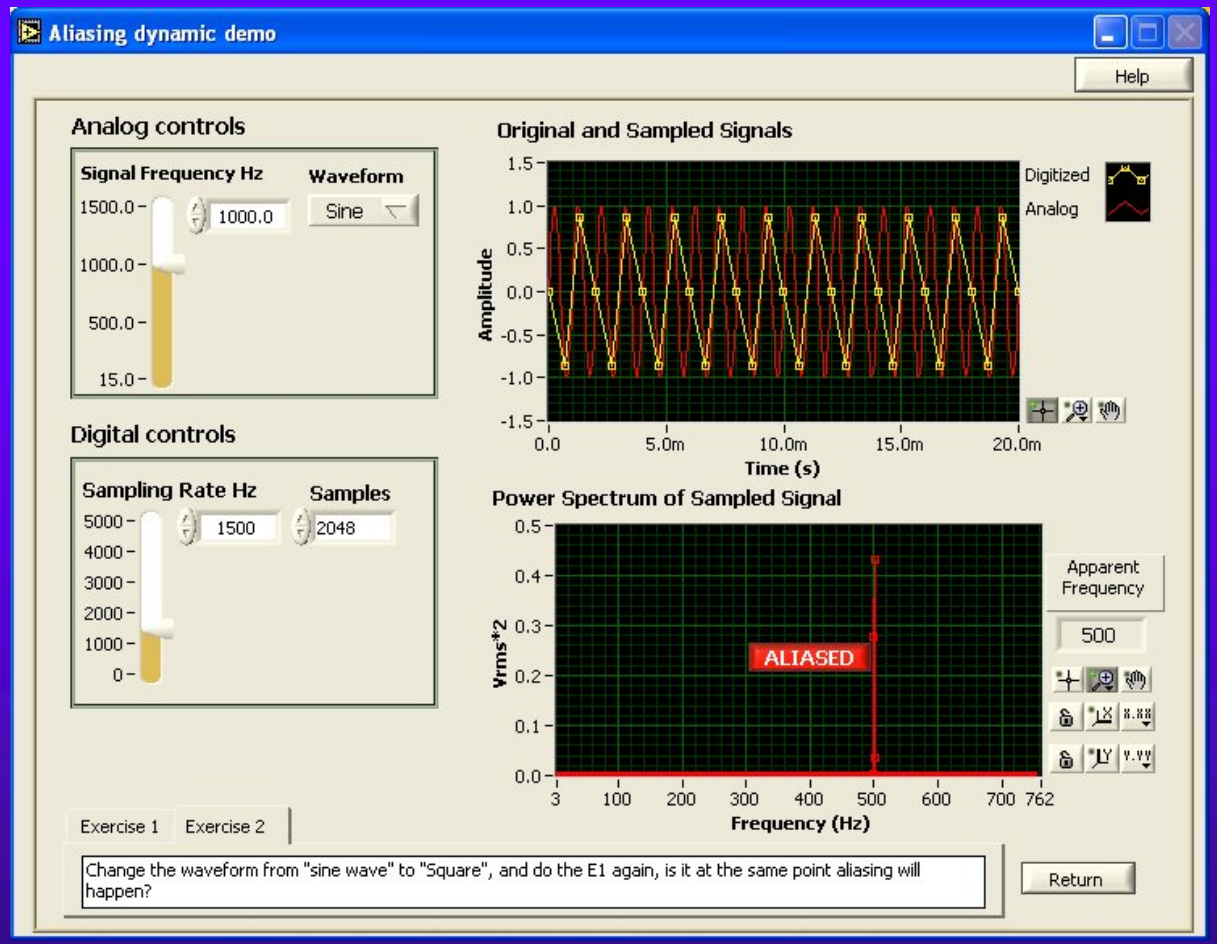
Signal Modulation Simulation



- **What you will learn?**

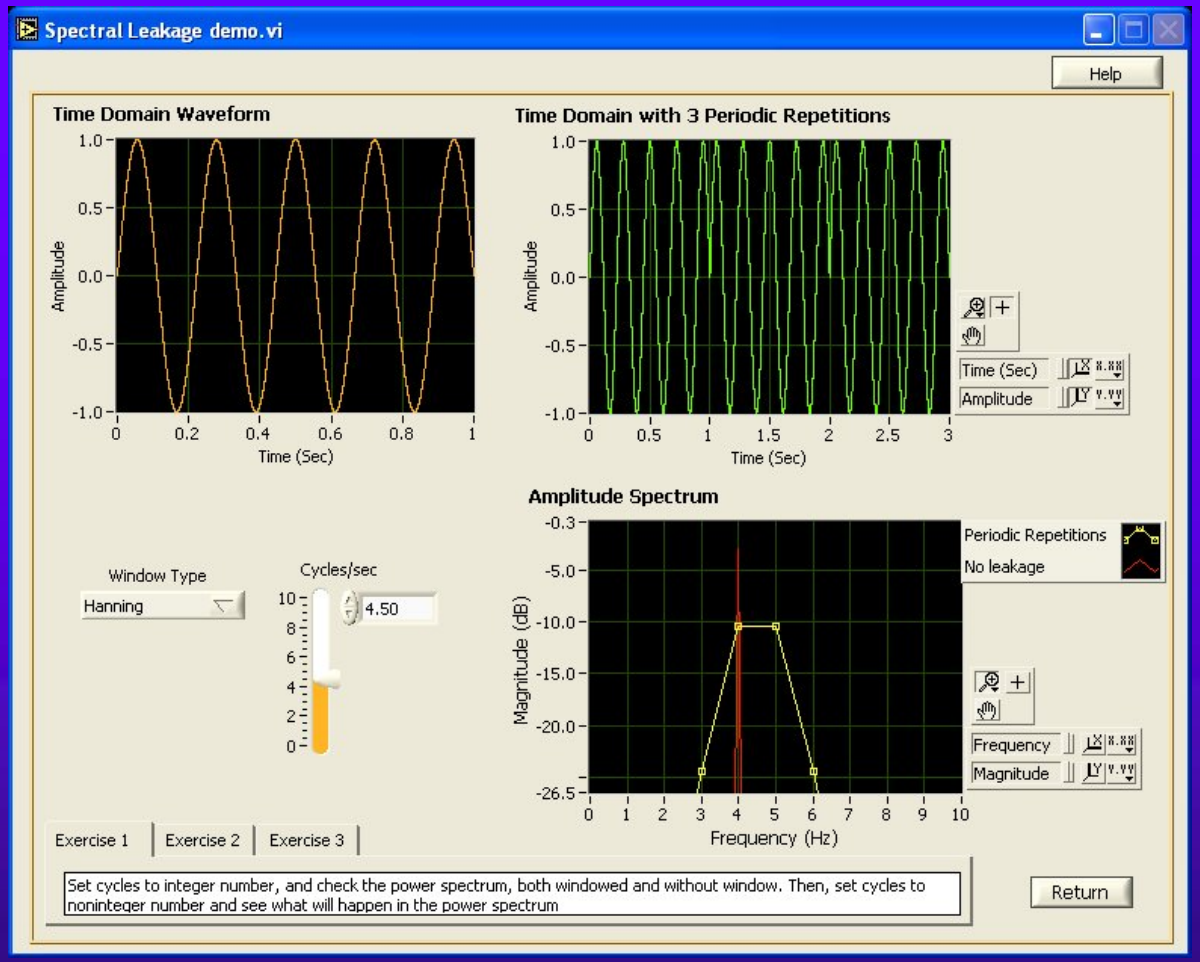
1. Concept of Modulation.
2. Classification of Modulation.
3. Detailed explanation of Amplitude Modulation and Frequency Modulation.

Aliasing Simulation



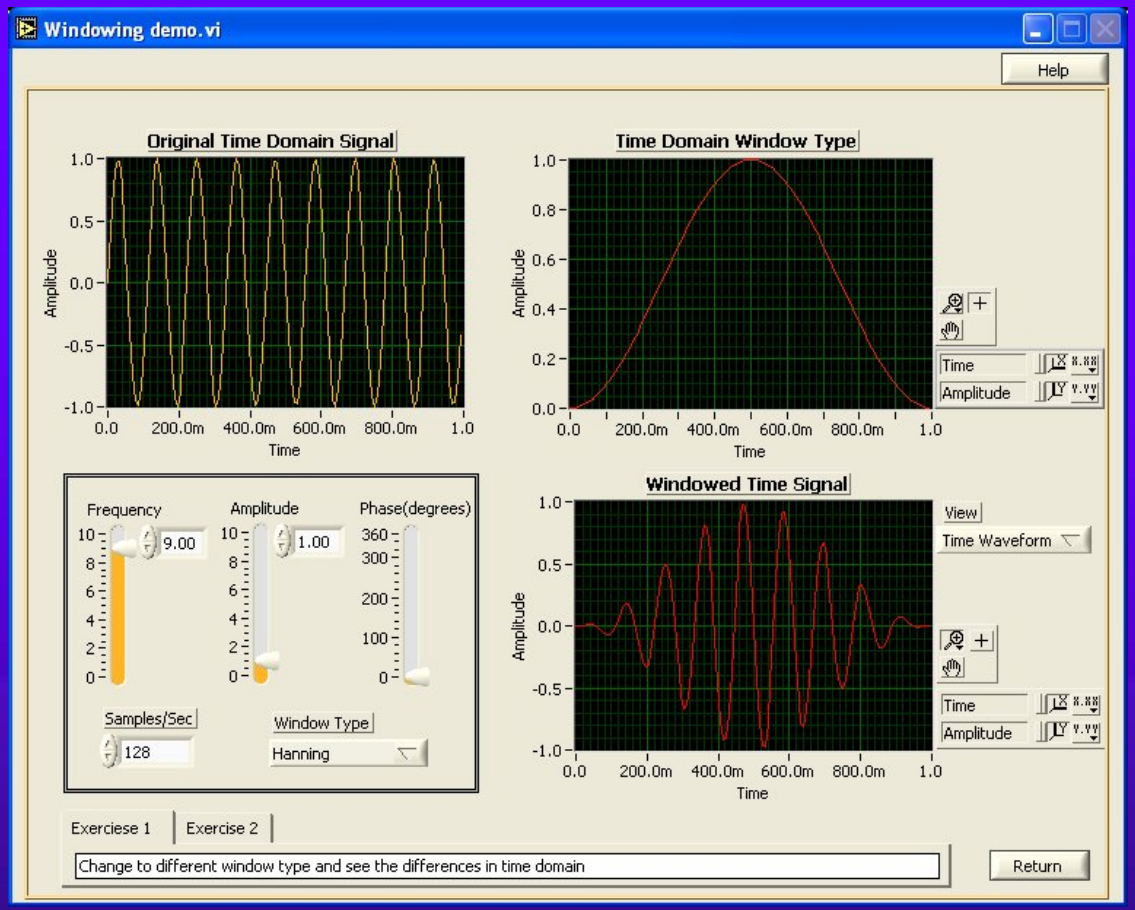
- **What you will learn?**
  1. Nyquist Sampling Theory.
  2. When Aliasing will happen?
  3. How to select sampling frequency correctly?

Leakage Simulation



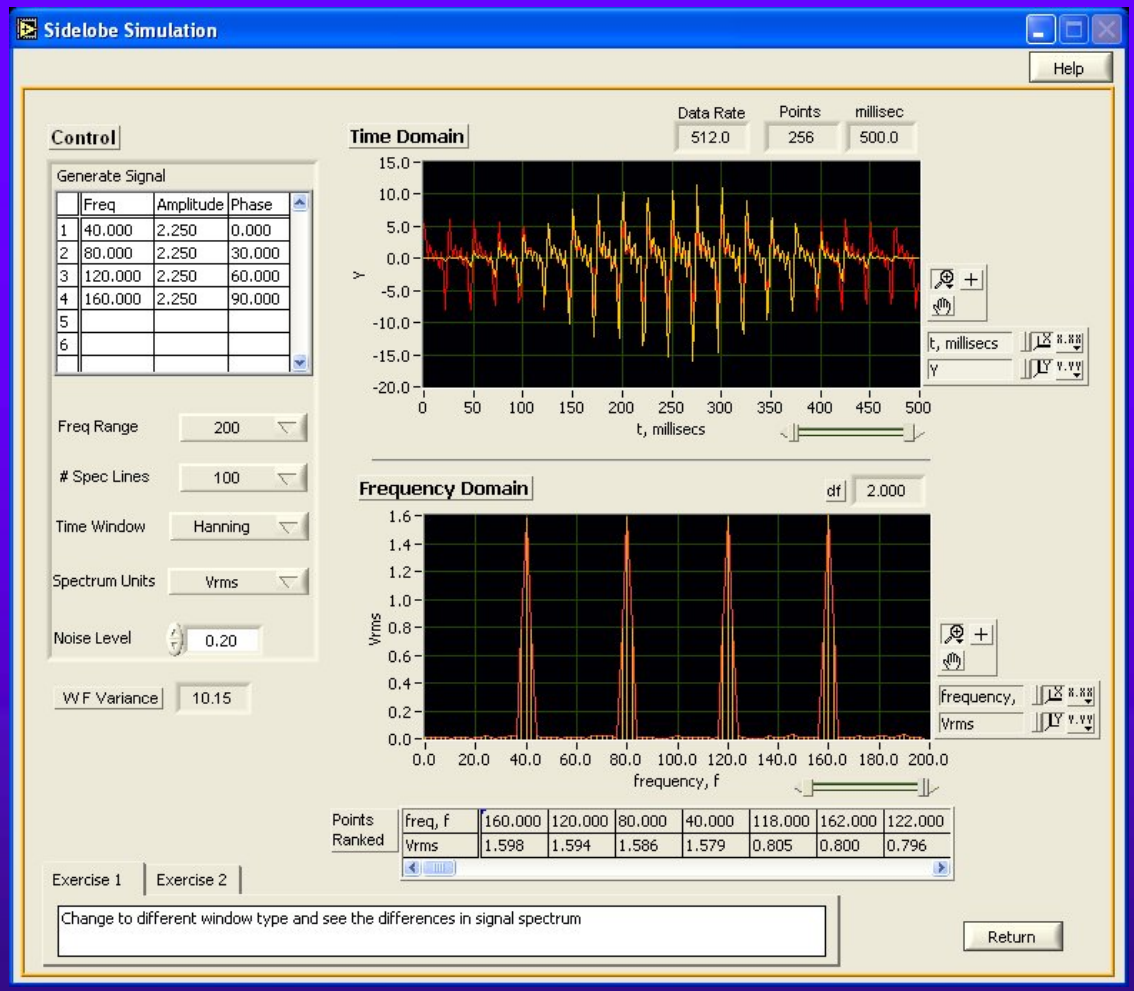
- **What you will learn?**
  1. Concept of leakage effect.
  2. How to reduce the leakage effect?

Windowing Simulation



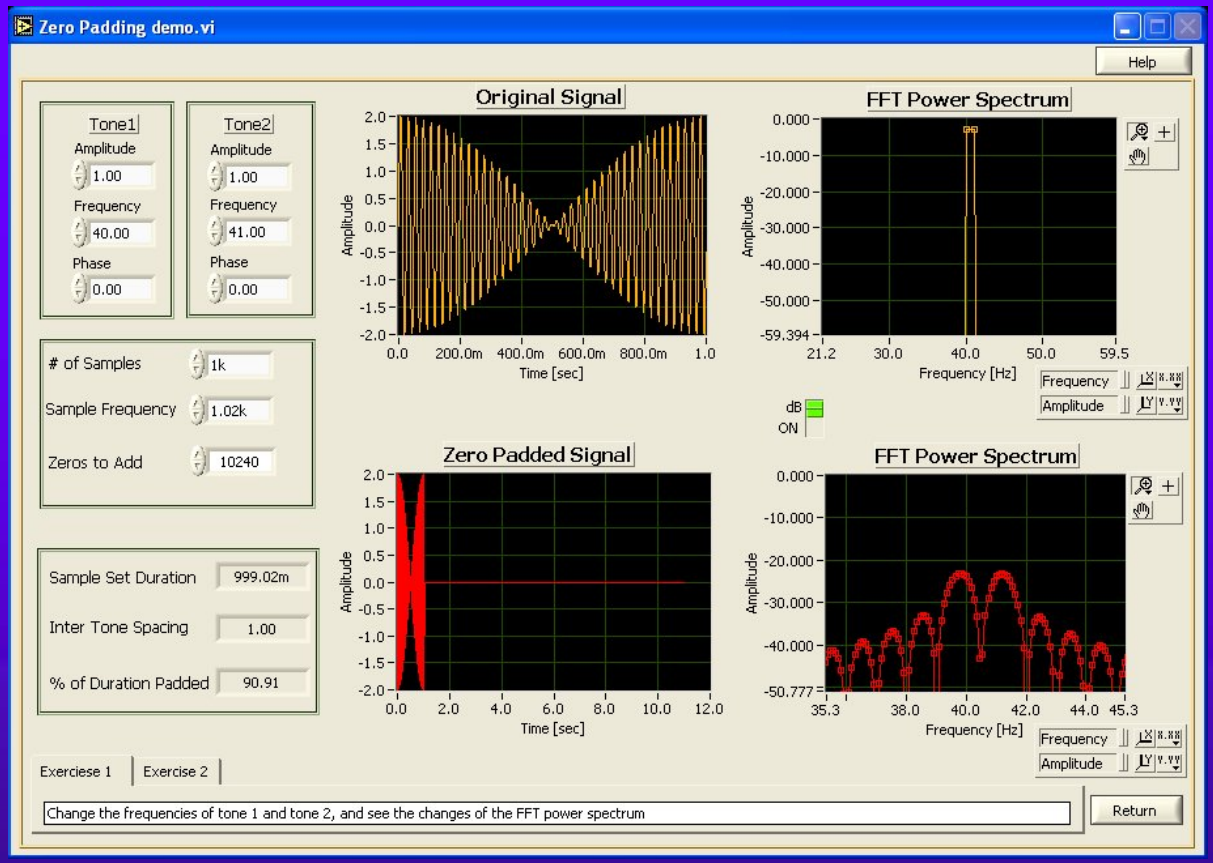
- **What you will learn?**
  1. Concept of Windowing.
  2. Common used Window types.
  3. Characteristics of different Windows.
  4. Strategies of choosing Window function.

Sidelobe Simulation



- What you will learn?
  1. Concept of Sidelobes.
  2. Frequency characteristics of windows.
  3. Existence of Sidelobes.

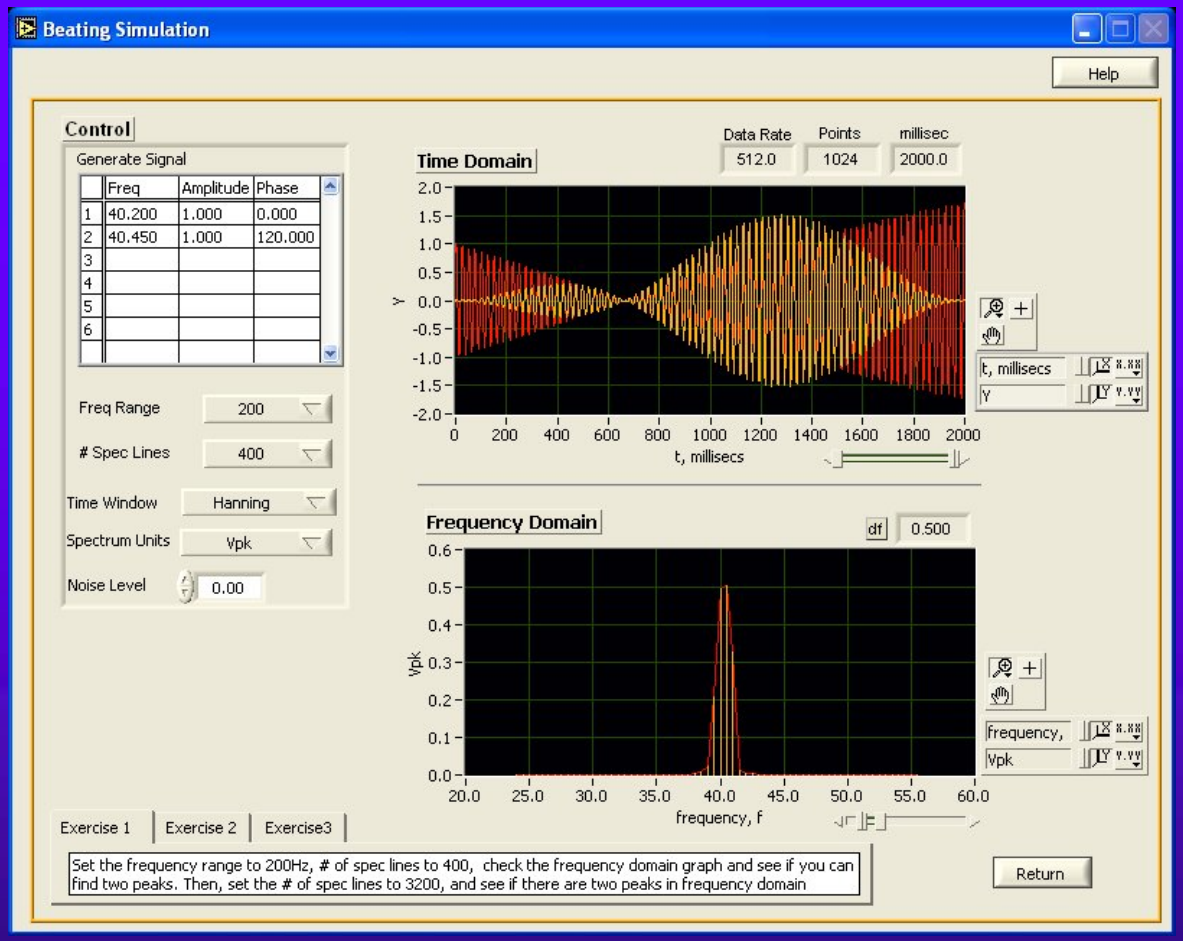
Zero Padding Simulation



- **What you will learn?**

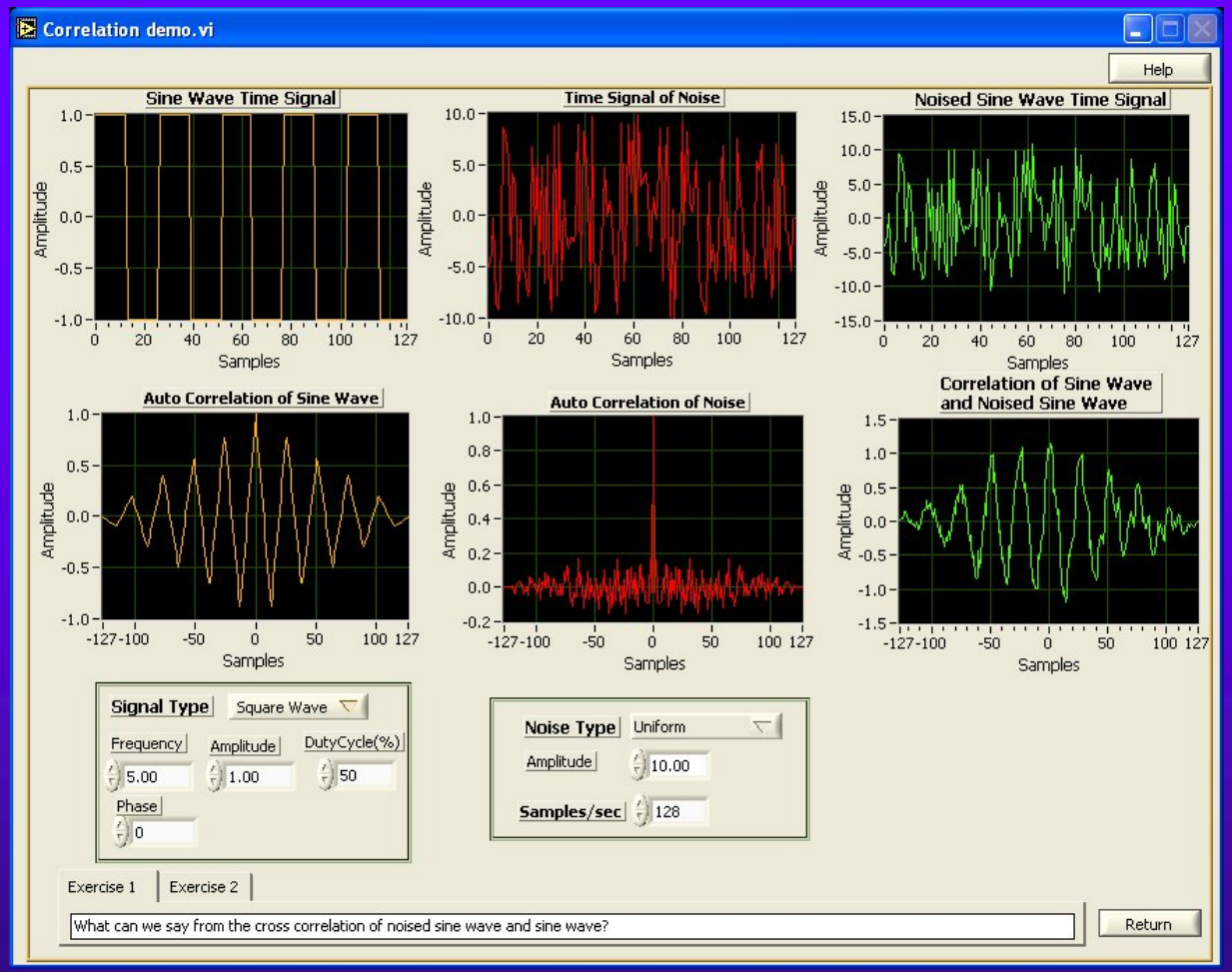
1. Concept of Zero Padding.
2. Why Zero Padding is useful.
3. The limitation of Zero Padding.

Beating Simulation



- **What you will learn?**
  1. Concept of Beating.
  2. When beating will happen?
  3. How to choose frequency resolution to avoid Beating?

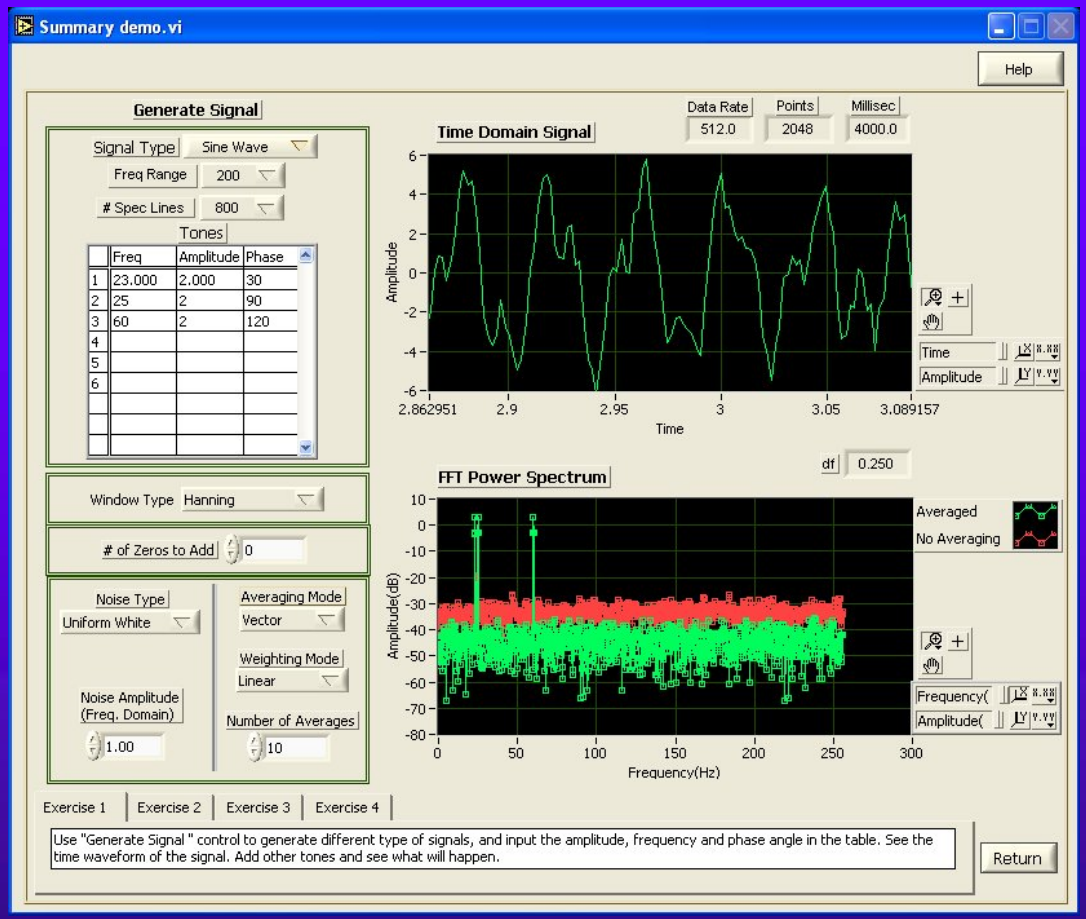
Correlation Simulation



- **What you will learn?**
  1. Concept of Correlation.
  2. Application of Correlation.

Summary Simulation

- **Final simulations to test your knowledge**



Contact!

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