NIDays

WORLDWIDE GRAPHICAL SYSTEM DESIGN

CONFERENCE

NATIONAL INSTRUMENTS

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LabVIEW™
MathScript

Algorithm Engineering with Textual Maths with LabVIEW

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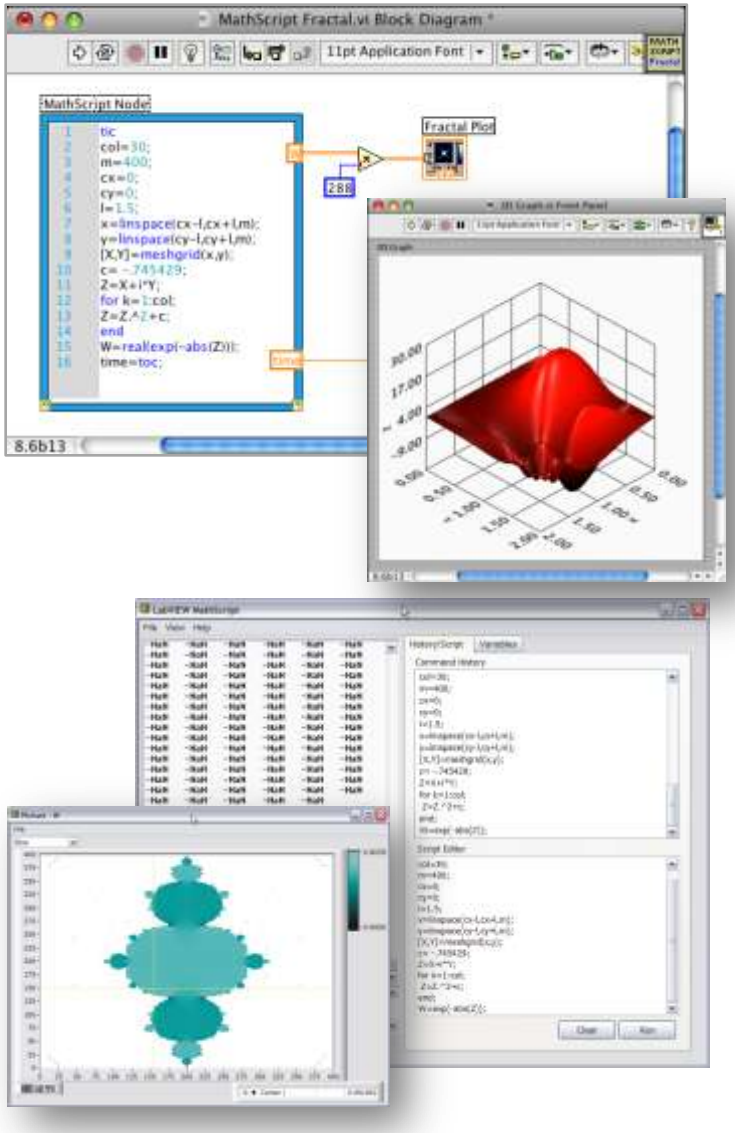
LabVIEW MathScript



Text-based signal processing, control design and maths within LabVIEW

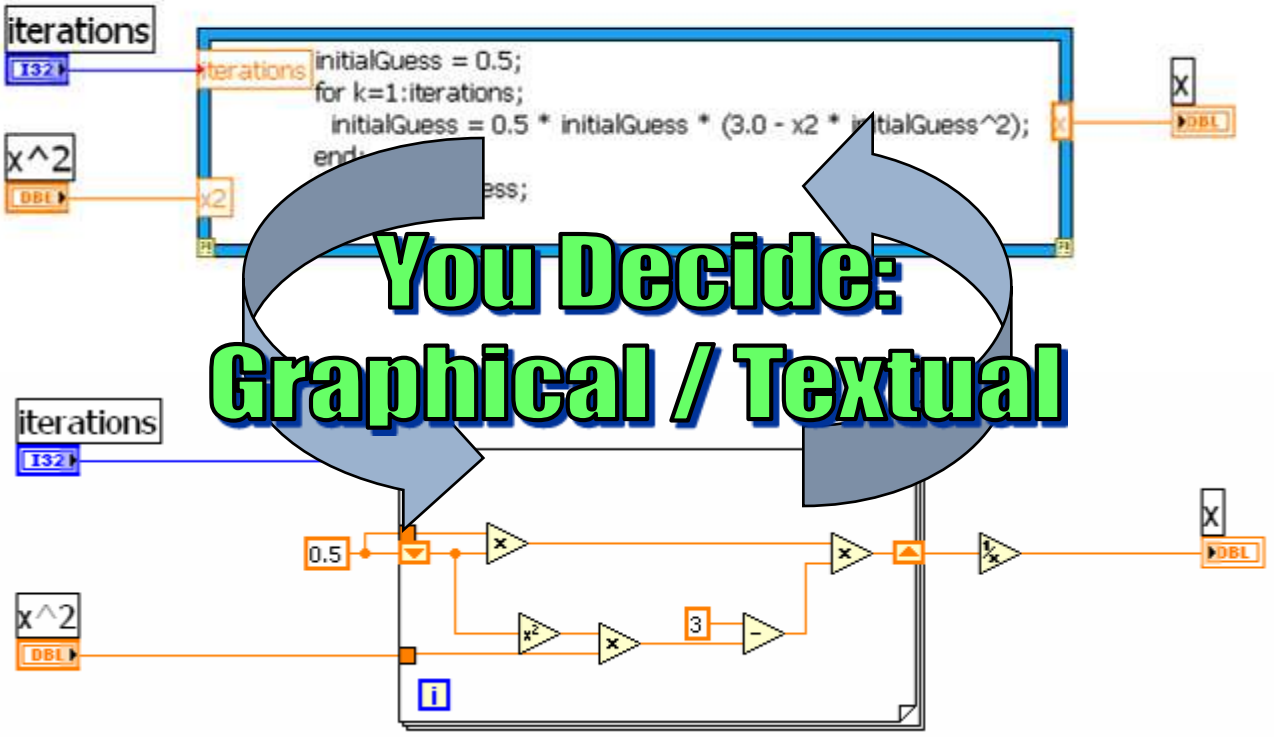
- More than 750 built-in functions
- Reuse many of your .m file scripts created with The MathWorks, Inc. MATLAB® software and others
- Based on original maths from NI MATRIXx software

A native LabVIEW solution

- Interactive and programmatic interfaces
- Does not require 3rd-party software

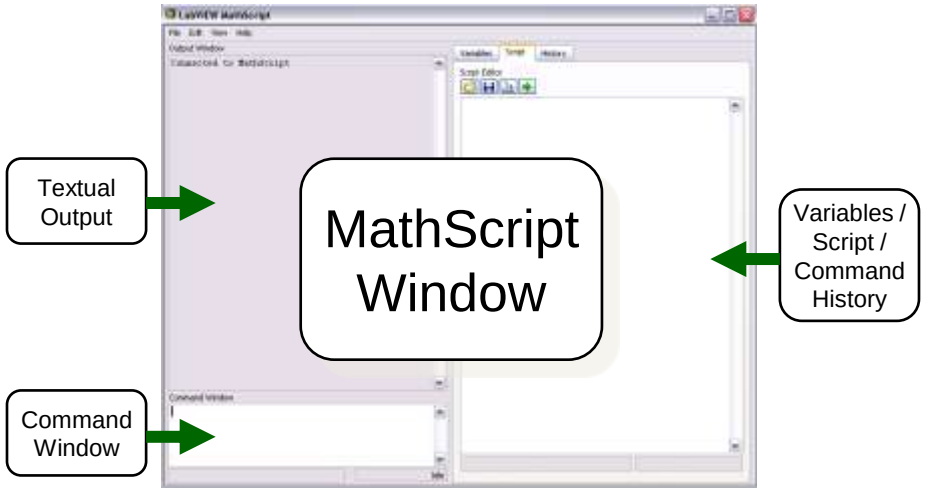
Instrument your Algorithms and Math

- Freedom to choose the most appropriate syntax: textual, graphical or a combination



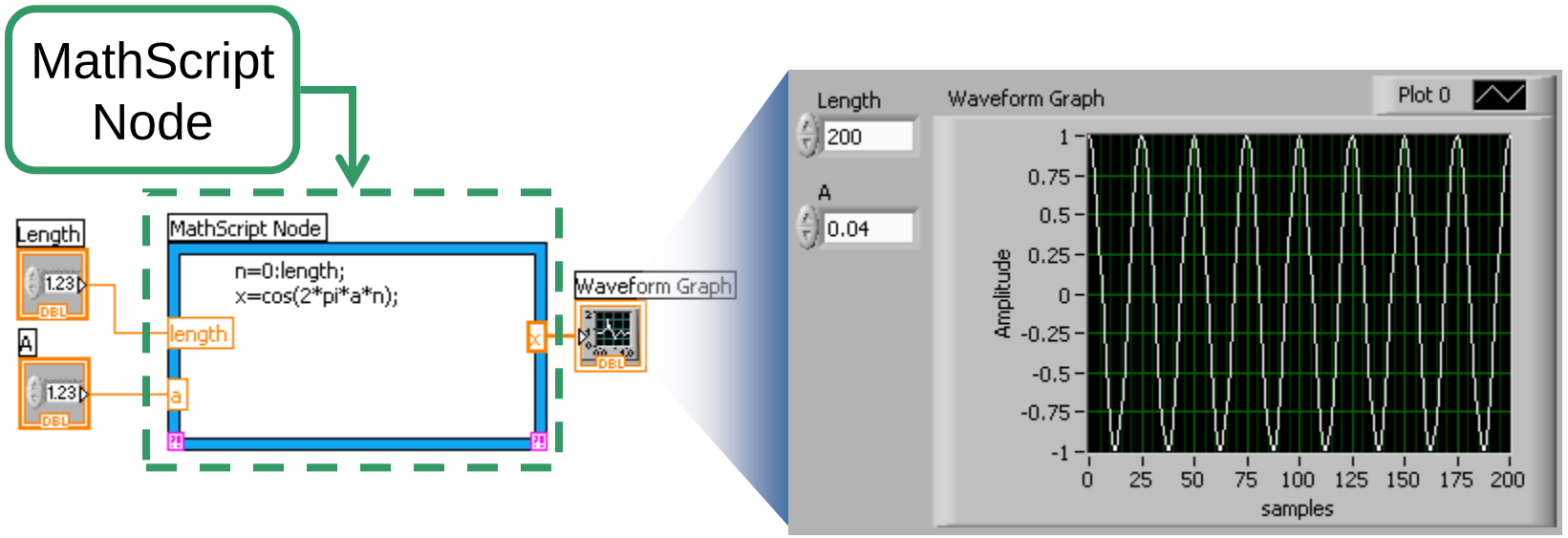
Interactive Math with the MathScript Window

- **Fully integrated into LabVIEW**
  - Access from LabVIEW menubar (Tools→MathScript Window)
  - No need for 3rd party applications
- **Interactive interface**
  - Enter m-file script commands, see immediate response
  - Open / run saved m-file scripts
  - View text output, command history, variables, and plots



Programmatic Math with MathScript Node

- Combine graphical system design with textual math
- Implement equations and algorithms with text
- Deploy with LabVIEW graphical programming
  - Input and Output variables created on the border



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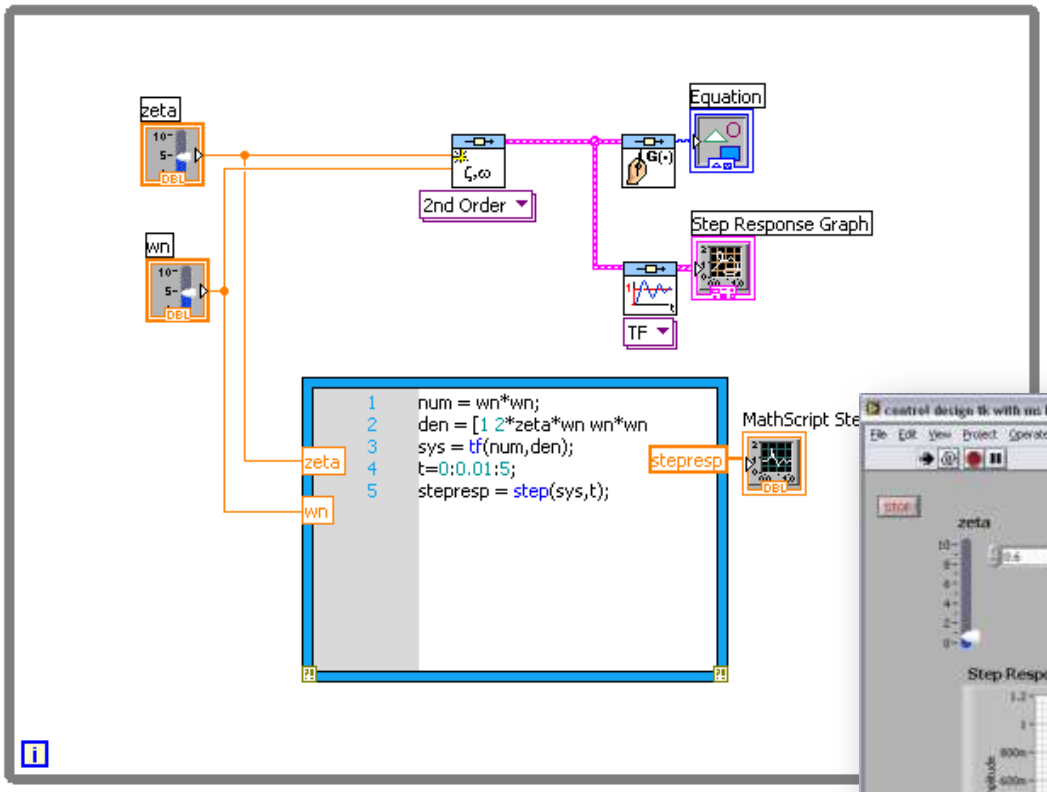
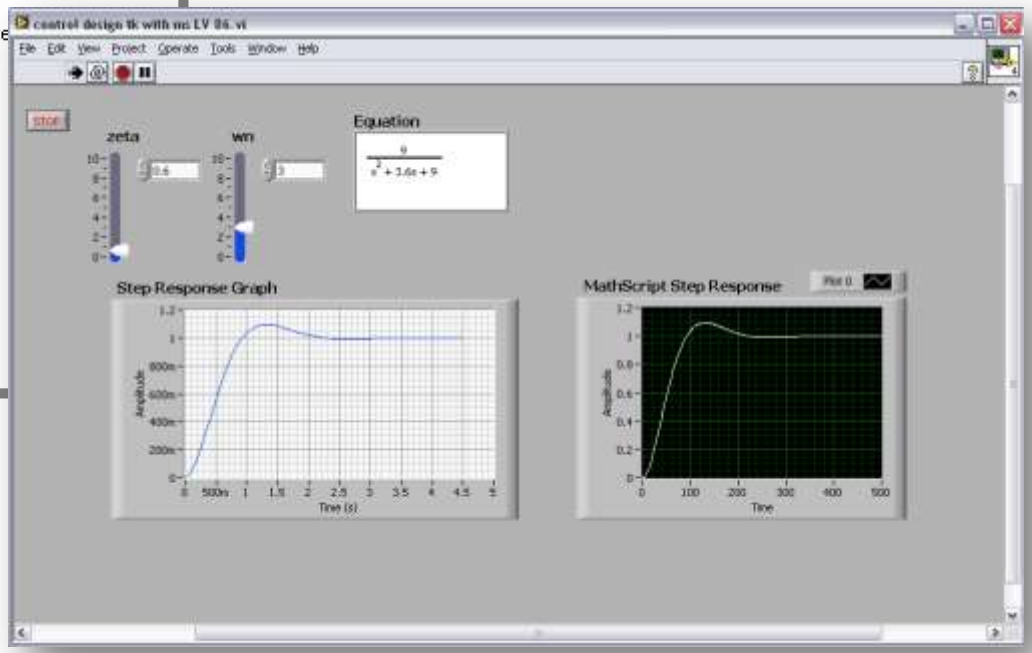
Second Order System Software Demo





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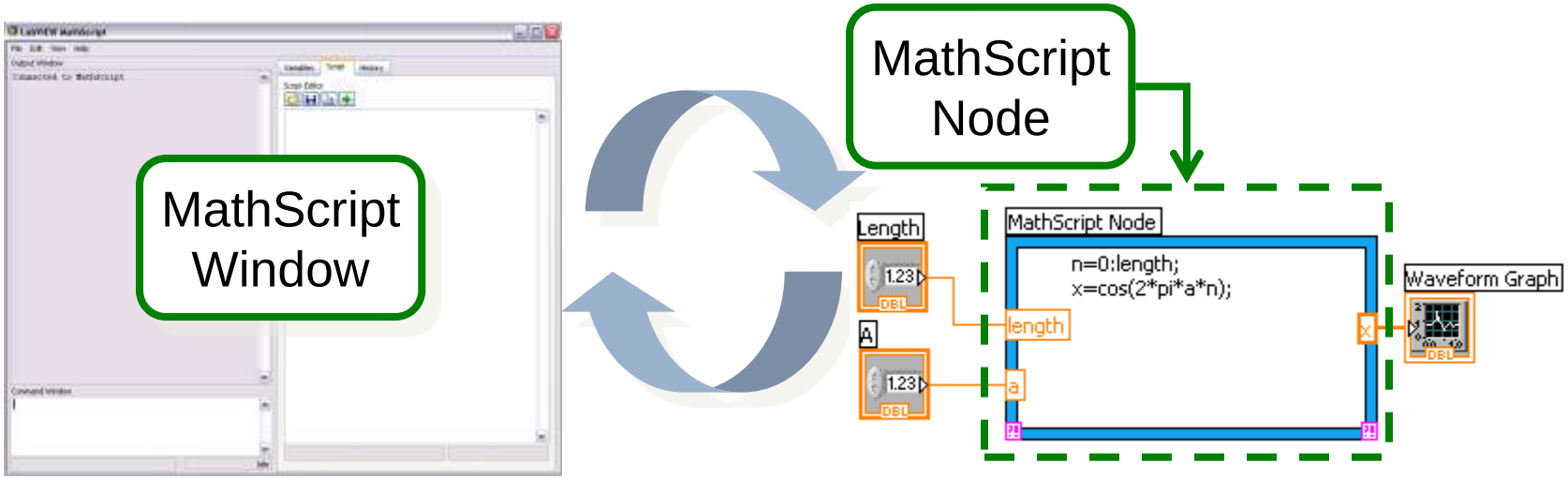
Working with LabVIEW MathScript

- Develop scripts interactively with the MathScript Window
- Move to the MathScript Node to “Instrument your Algorithms”
- Move back and forth as necessary to complete your work



Exercise 1

- What you will learn:
  - Use the MathScript Node
  - Use the Interactive MathScript Window
  - Load existing scripts into the MathScript Node.
- Create and Application that:
  - Does signal analysis via textural math

Exercise 2

- What you will learn:
  - Tight integration of MathScript in LabVIEW code

- Create and Application that:
  - Displays a histogram of an image and lets you threshold the data

Technical Considerations (Caveats)

- Performance
  - Compile time increases with script length
  - Slow vector / matrix indexing with loops
  - G is always faster than MathScript
- Compatibility
  - Unsupported variable types
  - Functionality from all toolboxes is not supported
- Usability
  - Interactive window lacks debugging capability