Introduction to MATLAB

MATLAB Graphic User Interfaces (GUI)

Computer Applications in Civil Engineering

Drs. Trani and Rakha
Civil and Environmental Engineering
Virginia Polytechnic Institute and State University

Spring 2000

Purpose of this Section

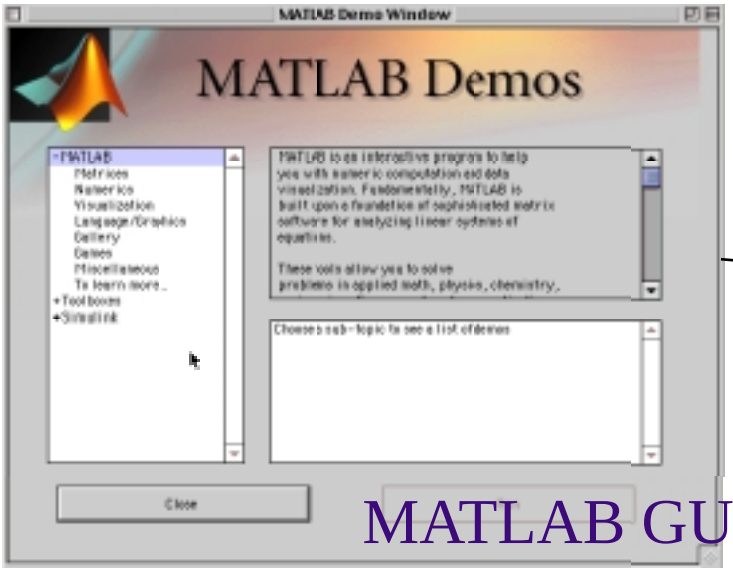
- To illustrate some examples of the potential GUI capabilities of MATLAB
- To illustrate some of the basic principles in creating useful GUIs

Suggested reading: Chapter 6 in Pratab

Creating Graphic User Interfaces in MATLAB

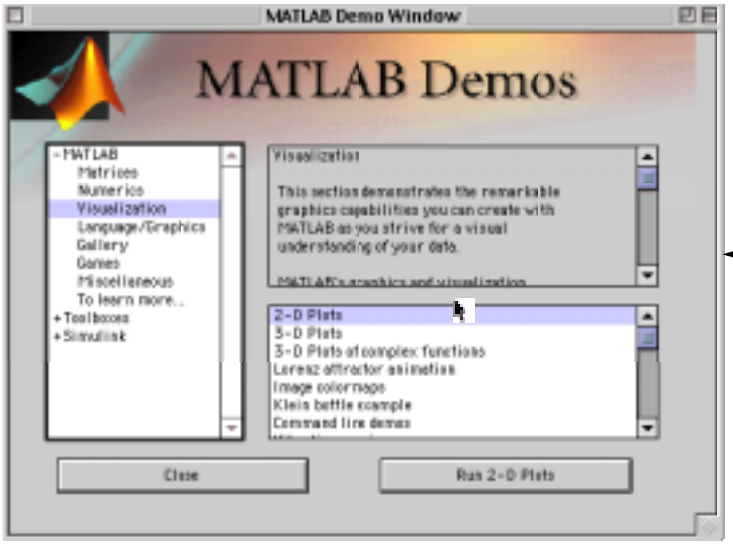
- MATLAB has modest resources to create a Graphic User Interface (GUI)
- A GUI might be useful for applications where navigation complexity is an issue
- A GUI might be useful to present students with information about a model
- The GUI tool included in MATLAB is similar to those found in many high-level languages (drag-drop approach). The idea is to create a simple interface dragging some pre-built objects to an empty figure
- To start the GUI tool type >>guide at the Command prompt

Mechanics of a Typical GUI



MATLAB GUI

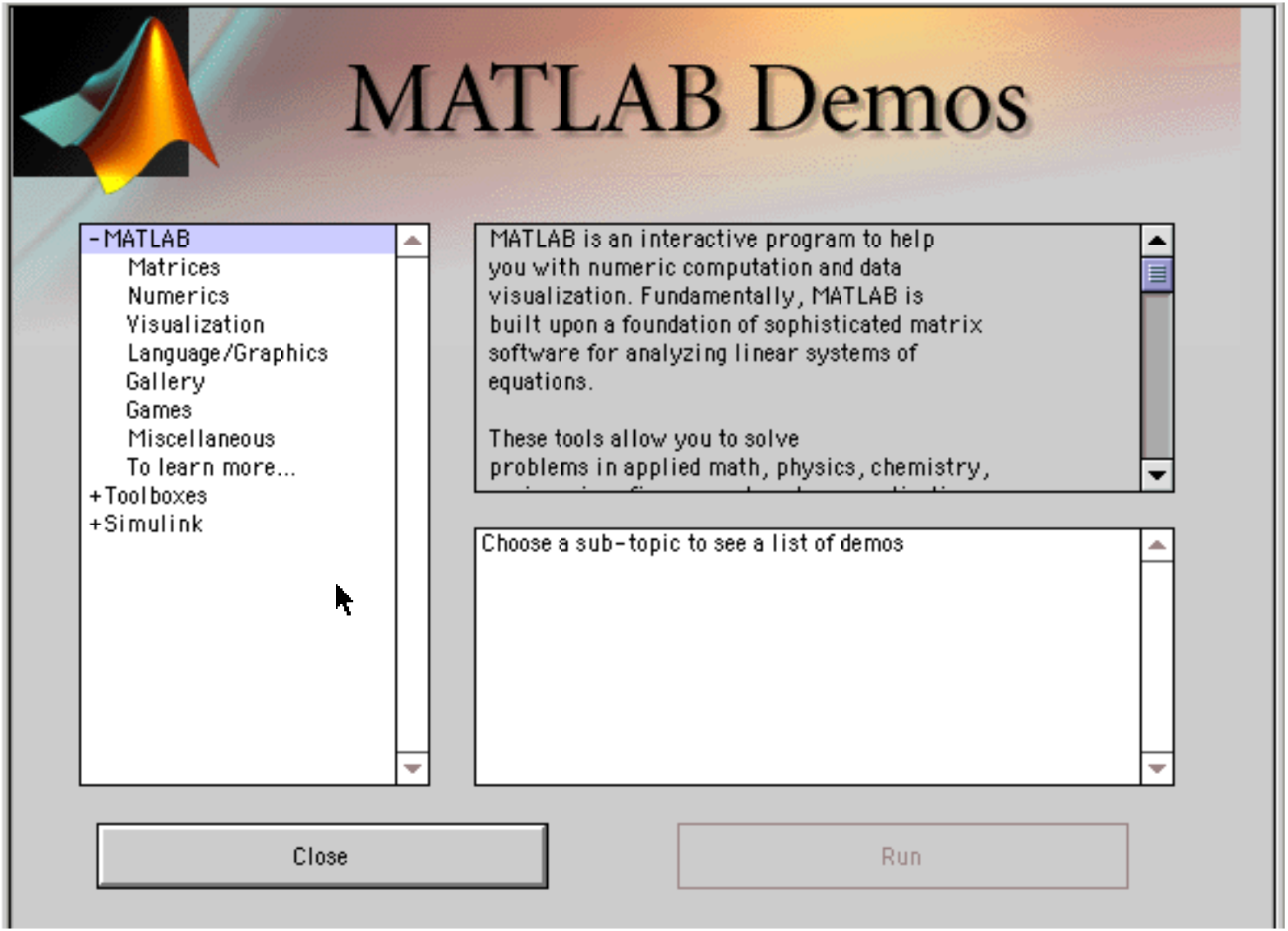
Callback function




```
% Define Initial Conditions of the Problem

yN = [200 200 0];% yN defines intial conditions for...
                 state variables

to = 0.0;% to is the initial time to solve this...
           equation (yr)

tf = 10.0;% tf is the final time (yr)

tspan = [to tf]
```

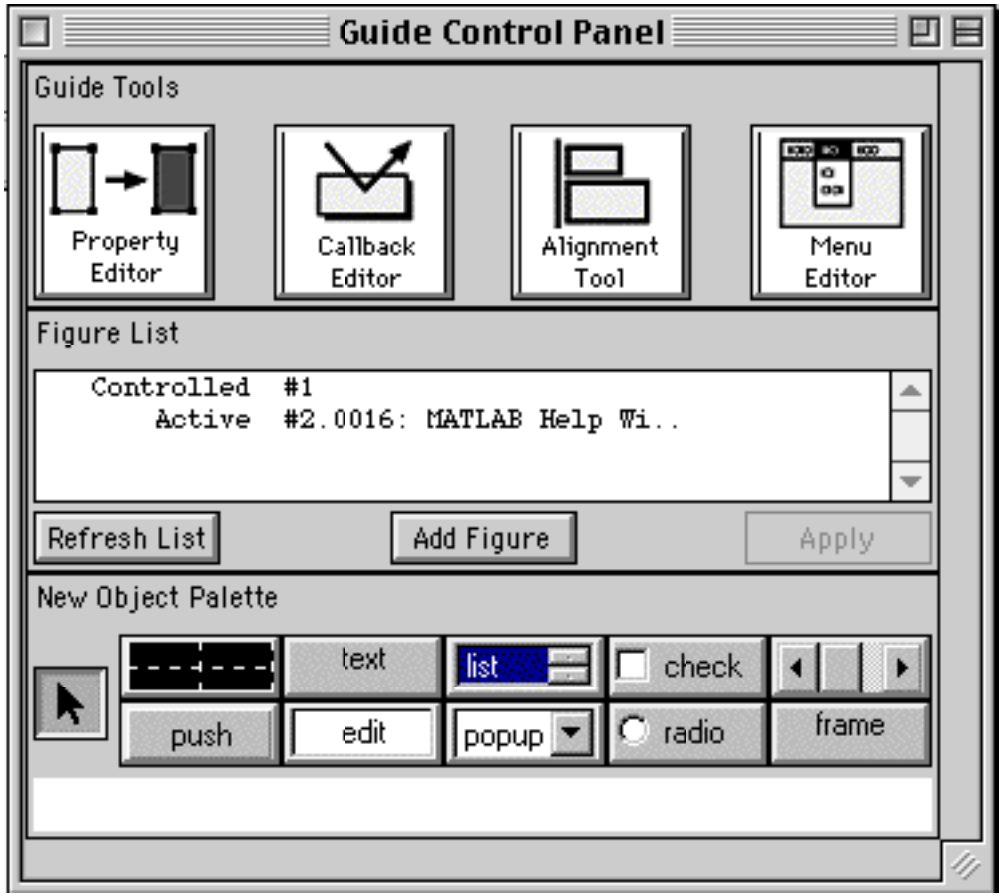
MATLAB Code

Sample GUI Created In MATLAB



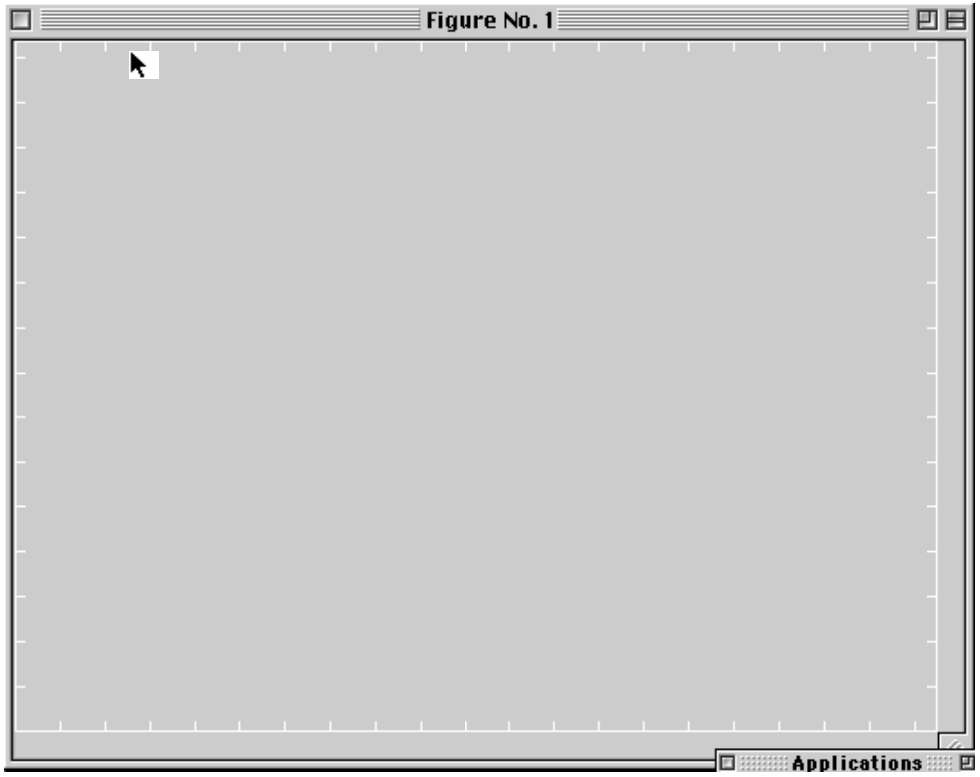
GUI Guide Interface

The MATLAB GUI guide is where you start the process of building an interface



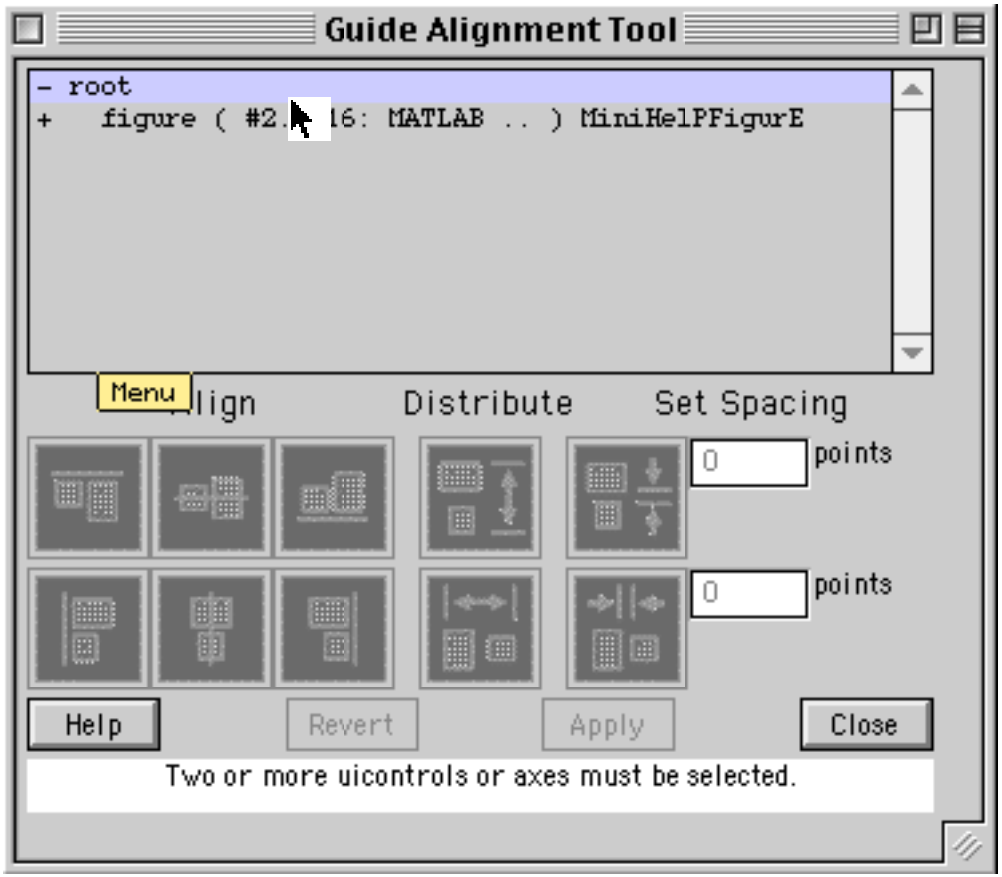
GUI Figure Start-up

- Once guide is invoked an empty figure is generated
- Note the grid guides to allow positioning control of objects



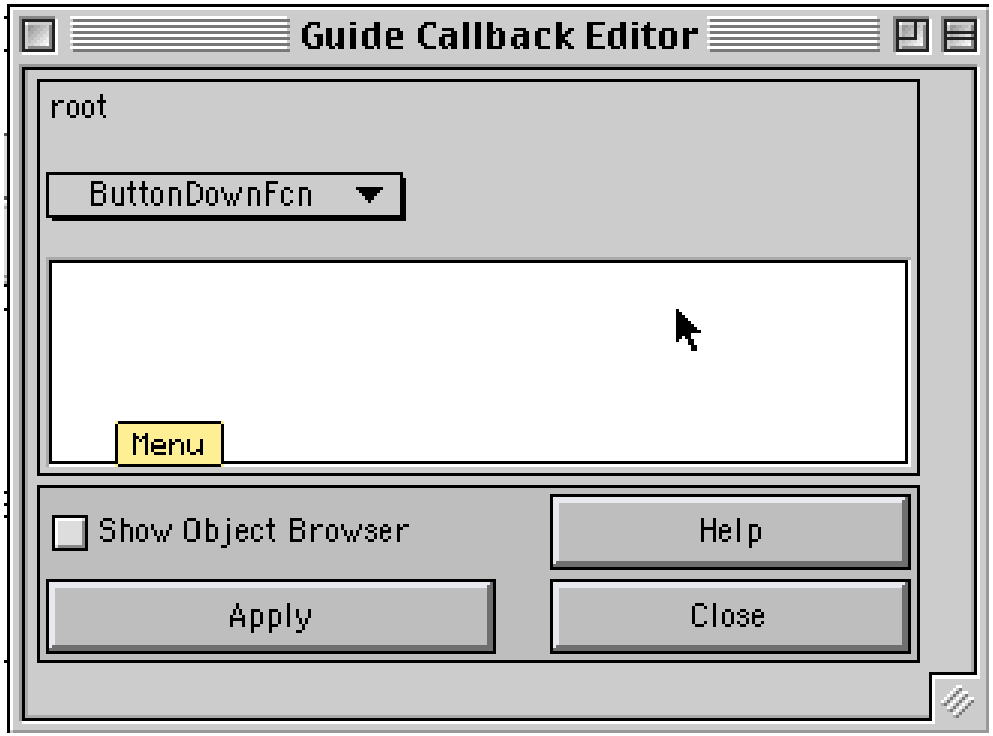
Alignment Control Window

The alignment control window allows precise control of graphical object



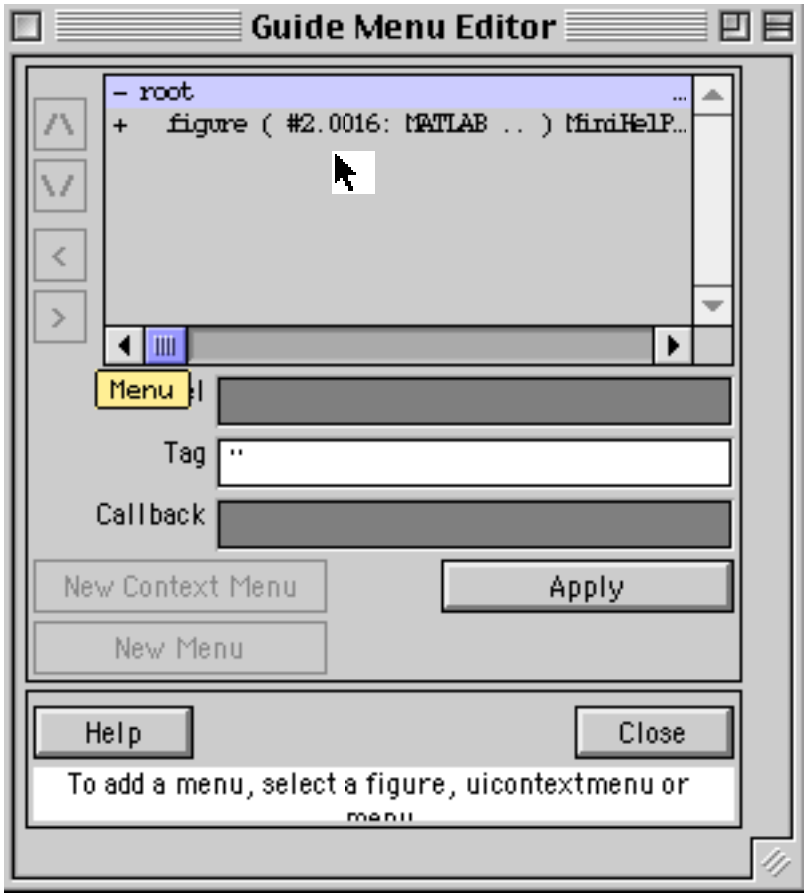
Callback Window Editor

In the callback window editor you enter script actions that connect your GUI with pieces of the MATLAB code



Menu Editor

The menu editor allows you to add and create pull-down menu items in your interface



Further Reading in MATLAB

- There are numerous textbooks on MATLAB. Here is a partial list of textbooks that might be useful in future studies:

1) *Getting Started with MATLAB 5: A Quick Introduction for Scientists and Engineers*. Rudra Pratab. Oxford University Press, 1998 (ISBN 0-19-512947-4).

2) *MATLAB for Engineering Applications*. William J. Palm. WCB Mc-Graw Hill, 1998 (ISBN 0-07-047330-7).

3) *MATLAB 5 for Engineers* . Adrian Biran & Moshe M.G. Breiner. Addison-Wesley, 1999 (ISBN 0-201-36043-8)

General Books About MATLAB

4) *Engineering Problem Solving with MATLAB, 2e*. Delores M. Etter. Prentice Hall, 1997 (ISBN 0-13-397688-2)

5) *Essential MATLAB for Scientists and Engineers*. Brian D. Hahn. Arnold Publishing Co., 1997, (ISBN 0-470-25013-5)

6) *Introduction to MATLAB for Engineers*. William J. Palm III. McGraw-Hill, 1998 (ISBN 0-07-047328-5)

7) *Mastering MATLAB 5: A Comprehensive Tutorial and Reference*. Duane C. Hanselman & Bruce Littlefield. Prentice Hall, 1998 (ISBN 0-13-858366-8)

General Books About MATLAB

8) *Graphics and GUIs with MATLAB: 2e*. Patrick Marchand. CRC Press, Inc., 1999 (ISBN 0-8493-9487-2)