Today’s lecture
• Finish up Mathematica

Review of Lecture 16

• Looked at Mathematica functions in more detail
  – Control: If, Which, and Switch functions
  – Logical expressions in Mathematica == != > >= < <=
  – Logical expressions: ! && ||
  – Looping with Table or Do[body, {j, start, end, inc}], While, and For constructions.
  – Pattern matching
Review of Module and Block

- Both used for local variable manipulation
  - Module[{local1, local2,…}, body]
  - Block[{local1, local2,…}, body]
- Module and block differ in their side effects
  - Module created temporary variables
    - $Modulenumber
  - Block temporarily modifies variables
- Generally Module is preferred, but Block is useful in testing situations.
- See Mathematica Help

Final Topics

- Finishing up our overview of what is available in Mathematica.
- Errors
- Message Control
- Lists
- Graphics
- Built-in Packages
- Customizations
Errors

- Errors in Mathematica occur in different levels of severity
  - benign, easily fixed, syntax errors reported by Mathematica (*e.g.* incorrect bracket matching)
  - errors that require an abort
  - errors that crash Mathematica
  - errors that crash the system
- Errors often depend upon context

Error and Message Control

- Common types of messages
  - Usage Statements
  - Error Messages
- Creation
  - `functionName::usage="string"`
- Invocation
  - `Message[]`
- Control
  - `On[]` or `Off[]`
Lists

- Lists are central to most of what is done with Mathematica
- Anything can be an element of a list
- Lists can be nested arbitrarily deep
- Lists can be used just as collections of things
- Lists can be vectors and matrices (if of the proper form)
  - see Mathematica help
- Lists can be sets
  - see Mathematica help
- Functions can be mapped over lists

Graphics

- Upside: You can plot anything
- Downside: It can be tedious
- Types of graphics
  - Plot[] (two-dimensional plot of a function)
  - ListPlot[] (two-dimensional plot of a list)
  - ParametricPlot[] (parametric plot)
  - PolarPlot[] (polar plot)
  - Plot3D[] (three-dimensional plot)
  - DensityPlot[] (color-table plot)
  - ContourPlot[] (contour plot)
  - and other combinations the above plot types (see text)
Graphics (continued)

- Exporting graphics
  - Can save as files in several formats
- See Beginner's Guide, Chapters 31-42 for examples
- Examples of imported plots (pict on left, eps on right)

Packages

- Standard packages supplied with Mathematica
  - see Mathematica help
- Specialized packages (called Applications) can be purchased from Wolfram and Third Parties
- Users can create packages (jleGroup example)
Customization

- Front end and back end (kernel) customized separately
- Init.m files
- Autoload areas for Packages and Suites
- Stylesheets
- Multi-user environments (Athena)
  - First search for global configuration files
  - Then search for parallel local files
    - ~/.Mathematica/Configuration/Kernel/init.m
    - Etc.