RLink for Mathematica

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14 Oct 2006

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Outline

- What is R?
- RLink
- Using in Mathematica
- Future
- Beta

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R Project

- R is a gnu licensed statistical package
  - http://www.r-project.org/
- Research statisticians contribute new analytics to R
- Extensive data analytic/data mining capabilities
- Leveraging work from across Statistics community

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Data Mining

- Nonlinear mixed effects models
- Multivariate adaptive regression splines (MARS)
- Random forests
- Survival/reliability methods
- Bootstrapping
- Classification and regression trees

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RLink for Mathematica

- Four main interface functions
  - putR
  - getR
  - REVal
  - RGraph
- Supports scalars, vectors, matrices of integers, reals, strings
- Provides most R functionality

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RLink Limitations

- Must use R syntax
- Embedded parenthesis in R commands must be escaped
- Limited to scalars, vectors, and matrices of int's, double's, and string's
- REval only returns an error code
- Must use print command to print many results or see a help file
- Matrices are transposed
- Cannot retrieve parts of objects

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Potential Object Enhancements

- Array: allow arrays of any dimensionality
- Named matrices: R allows names for all dimensions of an array
- Data frames:
  - The basic data structure for many analysis is a data.frame, a rectangular array with columns of different types. Most importantly, categorical types are allowed, and these impact most linear models in that dummy variables for the categories are generated. Allow data.frame's.

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Potential Object Enhancements (cont.)

- Extension to allow arbitrary R objects.
  - All R objects are from the same underlying structure that is a named vector of some length and a union of types.
  - These could be imported into *Mathematica* as lists of lists.
- - Retrieve parts of objects

Potential Usability Enhancements

- A Mathematica to R converter so that R commands can be input as Mathematica commands
- Automatically putting *Mathematica* objects into R in REval
- REvalGet command

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RLink Beta

- RLink Beta
- Get @ http://www.scienceops.com/Wolfram.asp