Directions in Statistical Computing 2007

statistical software development, maintenance, and publishing

Outline

- Introduction
- Question & my Provocative Answer ☺
- Business Model
- R Framework (screenshots)
- Future work:
  Development of Compendium Publishing System (concept, screenshots)

Question

- Does it matter whether statistical software is created within a commercial or an academic environment?
- Yes it does…

On the other hand …

- there is no reason why we should treat academic software any differently from commercial software.
- both types should:
  - comply to the same quality standards;
  - be easy to use;
  - be cost-effectively produced, maintained, and implemented;
  - be distributed using sound marketing principles;
  - offer a real, measurable “added value” resulting in positive returns for the consumer and the producer.

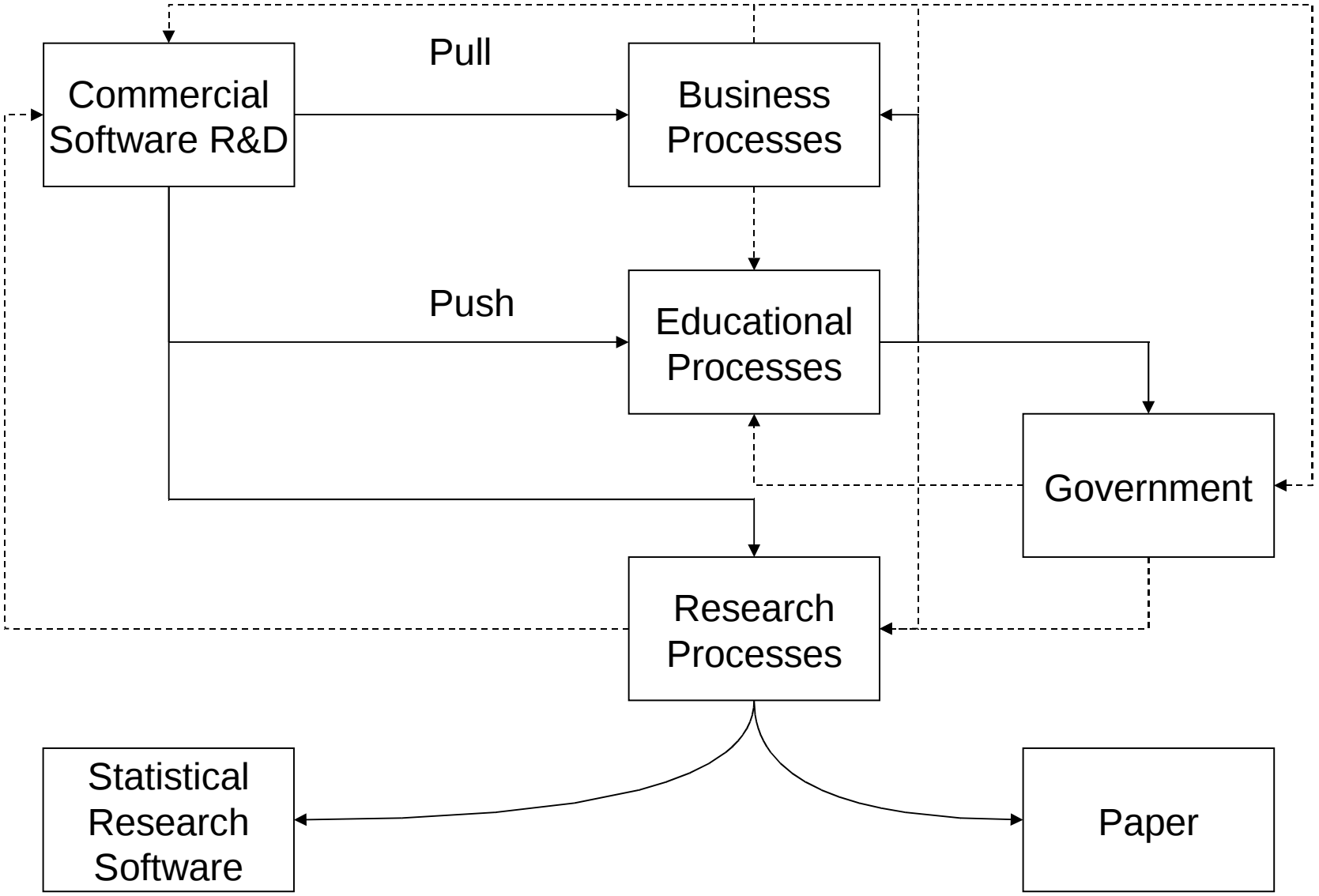
- Academic software should be managed as if it were a commercial product
- The observation that most academic software projects are free of charge, does not imply that the process of academic software development (incl. maintenance and publishing) is not bound to the basic laws of economics - applying to both costs and benefits.
- The costs are mainly associated with production, implementation, and dissemination. The benefits of dissemination on the other hand, are not virtual but real and measurable: e.g. in terms of increased funding for future research and development.

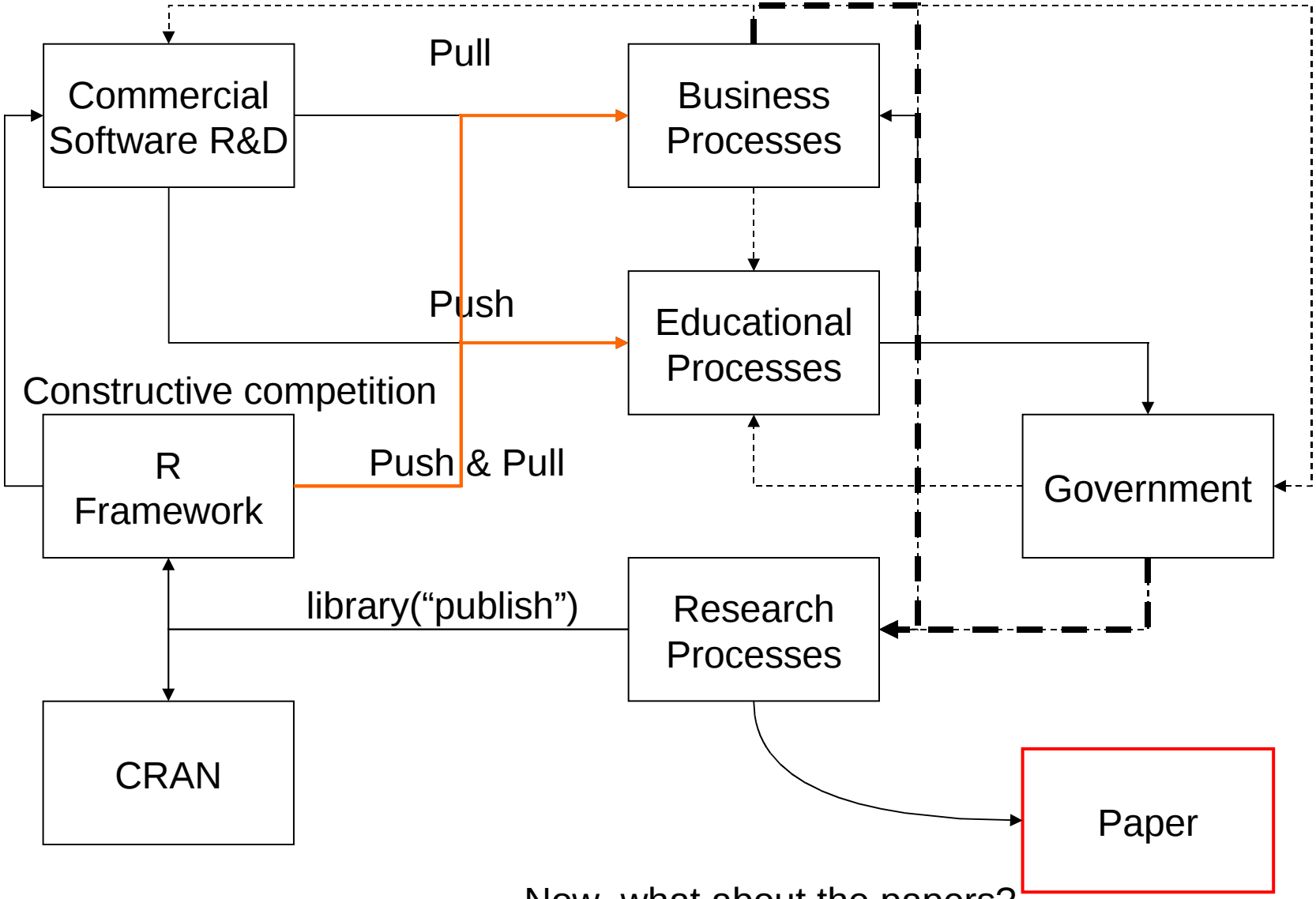
This paradigm implies that academic software…

- should be “leading”
  (making sure that commercial software is improved and adopts new methods)
- development should make “business sense”
- production, maintenance, and publishing should be “creditable”

(Very Simple) Business Model

for statistical software
development, maintenance,
and distribution


Commercial Software R&D
Pull
Business Processes
Push
Educational Processes
Government
Research Processes
Statistical Research Software
Paper



Now, what about the papers?
Do we want them to be part of the business cycle?

Problems – part 1

- Do we want Papers to be part of the business cycle?
  - It is hard to compete with the publishing industry
  - Open-access publishing on the internet is ‘disruptive’*
  - Cartel strategy employed by commercial publishers
- Cost of creating a paper*
  (published in an international peer-reviewed journal)
- Cost of dissemination of a paper
  (Ginsparg Index*)
- Cost per unit of impact
  (expected citation rates* SCI, SSCI, …)

Example (closed-access world)

- Cost of producing paper: 15 000 €
- Dissemination cost: 15 000 €
- Expected citation rate (mathematics, 2004) = 0.06

- Total cost per unit of impact = (30 000 € / 0.06) = 500 000 €

Problems – part 2

- Agency problems
  - Individuals need positive incentives to do what is best for the community
  - Make software development & maintenance count
- Meta-data is required and must be maintained
  - technical, usage, educational, …

R Framework

Building interfaces from meta-data
in
wessa.net

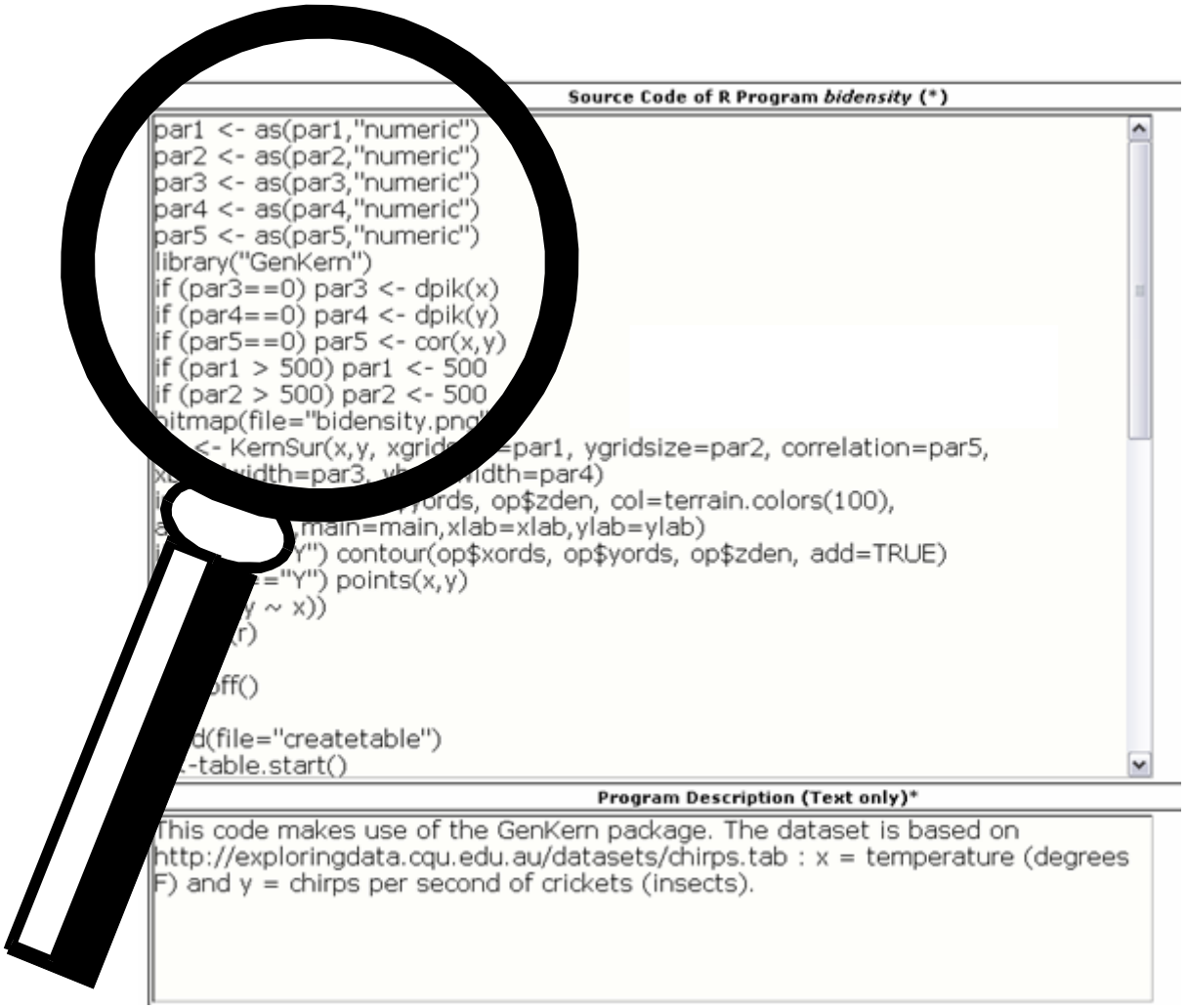
Example

- Let’s create a Bivariate Kernel Density module (based on an R package) that makes Business sense.

Input of Data & Parameters

Specification of Data Input	
Allow users to specify a subset of the dataset (from - to)	☑ Yes
Allow users to specify the width and height of charts	☑ Yes
Allow users to specify the minimum and maximum value of the y-axis	☐ Yes
Default Chart Title	Bivariate Kernel Density
Default X-axis Title	x
Default Y-axis Title	y
Number of datasets	2 datasets
Default dataset 1 (x)	88.6 71.6 93.3 84.3 80.6 75.2 69.7 82 69.4 83.3
Default dataset 2 (y)	20 16 19.8 18.4 17.1 15.5 14.7 17.1 15.4 16.2 15
Default dataset 3 (z)	
Number of parameters	7 parameters
Default value (par1) or comma-separated list	50
Label of par1	xgridsize
ToolTip of par1	
Default value (par2) or comma-separated list	50
Label of par2	ygridsize
ToolTip of par2	
Default value (par3) or comma-separated list	0
Label of par3	xbandwidth (zero to use default)
ToolTip of par3	
Default value (par4) or comma-separated list	0
Label of par4	ybandwidth (zero to use default)
ToolTip of par4	
Default value (par5) or comma-separated list	0
Label of par5	correlation (zero to use actual correlation)
ToolTip of par5	
Default value (par6) or comma-separated list	Y,N
Label of par6	display contours (Y/N)

R code with input validation



R code produces html

Source Code of R Program *bidensity* (*)

```
load(file="createtable")
a<-table.start()
a<-table.row.start(a)
a<-table.element(a,"Bandwidth",2,TRUE)
a<-table.row.end(a)
a<-table.row.start(a)
a<-table.element(a,"x axis",header=TRUE)
a<-table.element(a,par3)
a<-table.row.end(a)
a<-table.row.start(a)
a<-table.element(a,"y axis",header=TRUE)
a<-table.element(a,par4)
a<-table.row.end(a)
a<-table.row.start(a)
a<-table.element(a,"Correlation",2,TRUE)
a<-table.row.end(a)
a<-table.row.start(a)
a<-table.element(a,"correlation used in KDE",header=TRUE)
a<-table.element(a,par5)
a<-table.row.end(a)
a<-table.row.start(a)
a<-table.element(a,"correlation(x,y)",header=TRUE)
a<-table.element(a,cor(x,y))
a<-table.row.end(a)
```

Output is inserted cell by cell…

Meta-tags, links, citations

Specification of Output Page	
Allow users to specify the type of output (html, Word, Excel, ...)	☑ Yes
Name of page	bidensity
Main Title	Bivariate Kernel Density Estimation
Caption	Bivariate Kernel Density Estimation - Free Statisti
Description	This free online software (calculator) computes the Bivariate Kernel Density Estimates as proposed by Aykroyd et al (2002). The resolution of the image that is generated is determined by xgridsize and ygridsize (the maximum value is 500 for both axes). You may opt to have the contour lines
Keywords	statistics software, free online calculator, kernel density, contour plot, regression, correlation, bivariate kernel density
Menu Label This field is inactive because the software has been published on January 12 2006 16:27:26.	Bivariate Density
Menu Description This field is inactive because the software has been published on January 12 2006 16:27:26.	computes Bivariate Kernel Density Estimates
Citation of statistical methodology or applied work - 1.	Lucy, D. Aykroyd, R.G. & Pollard, A.M.(2002) Non-parametric calibration for age estimation. Applied Statistics 51(2): 183-196

R Version, Category, Author

R version	R-2.4.1
Category	Descriptive Statistics - Ungrouped - Bivariate
Command	Build User Interface
Send output to	Browser Black/White
Source (publication)	Lucy, D. Aykroyd, R.G. & Pollard, A.M.(2002) Nor
Author	author's name goes here
Submitted by*	
E-mail*	myemail@myhost.tld
	2zpj3p
Submit Program	

Editor’s screen

Recent Submissions waiting for approval

Author Home Page | Upload .RData | Request Library

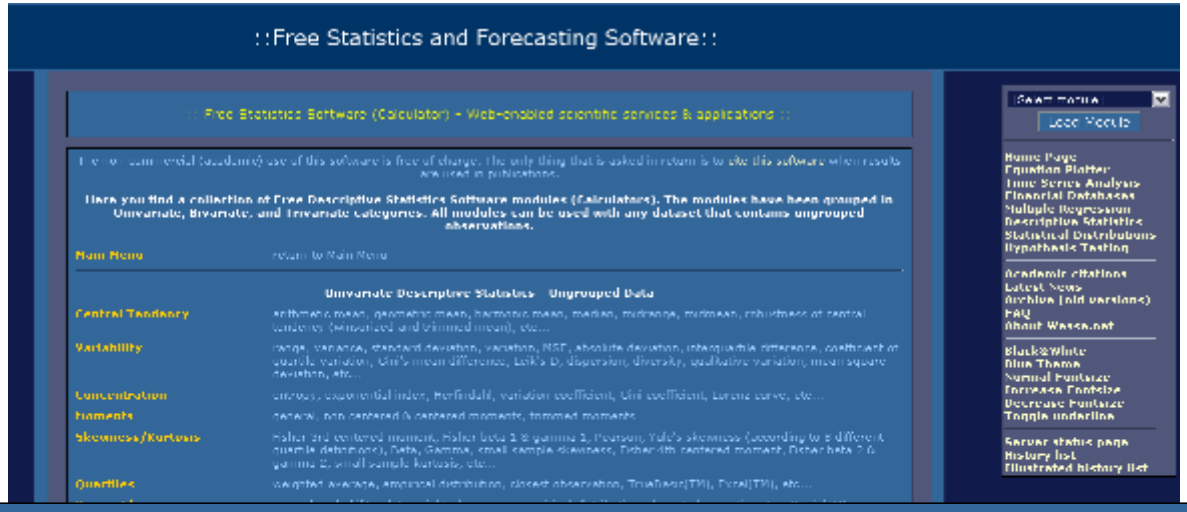
Name	Modified	Published	Action
3dplot.wasp	September 14 2006 03:10:00.	not published	view | edit | publish
JSE1_figure1.wasp	January 09 2006 03:27:00.	not published	view | edit | publish
JSE1_figure2.wasp	January 09 2006 02:46:31.	not published	view | edit | publish
NewRVersion.wasp	January 08 2007 06:39:17.	not published	view | edit | publish
QRW1.wasp	January 06 2006 10:00:50.	not published	view | edit | publish
QRW2.wasp	January 09 2006 05:07:30.	not published	view | edit | publish
RLibraries.wasp	January 04 2006 09:01:42.	not published	view | edit | publish
SimTest1.wasp	January 15 2006 14:15:15.	not published	view | edit | publish
SimTest2.wasp	January 14 2006 17:16:18.	not published	view | edit | publish
SimTest3.wasp	January 14 2006 15:05:04.	not published	view | edit | publish
backtobackhist.wasp	January 08 2007 06:42:48.	October 16 2006 15:17:04.	view | edit | publish
bidensity.wasp	January 08 2007 06:47:37.	January 12 2006 16:27:26.	view | edit | publish
bootstrap.wasp	January 14 2006 17:30:38.	not published	view | edit | publish
bootstrapplot.wasp	January 08 2007 07:10:33.	October 10 2006 06:49:24.	view | edit | publish
bootstrapplot1.wasp	January 08 2007 07:12:15.	October 10 2006 06:49:18.	view | edit | publish
boxcoxlin.wasp	January 08 2007 07:16:04.	October 08 2006 14:15:02.	view | edit | publish
boxcoxnorm.wasp	January 10 2007 03:38:21.	October 08 2006 16:12:00.	view | edit | publish
cdff.wasp	January 02 2006 04:53:02.	not published	view | edit | publish
cdfnorm.wasp	October 06 2006 10:34:14.	September 06 2006 15:44:33.	view | edit | publish
cdft.wasp	January 02 2006 04:54:30.	not published	view | edit | publish
cloud.wasp	January 02 2007 16:52:04.	October 05 2006 08:16:11.	view | edit | publish
density.wasp	October 06 2006 10:43:27.	January 08 2006 17:04:32.	view | edit | publish
dum.wasp	November 01 2006 07:38:28.	not published	view | edit | publish
edauni.wasp	October 06 2006 10:45:59.	October 03 2006 16:06:28.	view | edit | publish
fitdistrexp.wasp	October 06 2006 16:21:35.	October 07 2006 09:01:35.	view | edit | publish
fitdistrgamma.wasp	October 06 2006 13:30:33.	October 07 2006 09:01:48.	view | edit | publish
fitdistrlnorm.wasp	October 06 2006 16:01:40.	October 07 2006 09:01:59.	view | edit | publish
fitdistrlogistic.wasp	October 06 2006 17:12:30.	October 07 2006 09:02:11.	view | edit | publish
fitdistrnegbin.wasp	October 06 2006 17:40:21.	October 07 2006 09:02:23.	view | edit | publish
fitdistrnorm.wasp	October 25 2006 00:47:48.	September 06 2006 14:41:18.	view | edit | publish
fitdistrpoisson.wasp	October 06 2006 16:30:50.	October 07 2006 09:02:36.	view | edit | publish
fitdistrweibull.wasp	October 06 2006 10:21:03.	October 07 2006 09:02:48.	view | edit | publish
harrell_davies.wasp	October 22 2006 16:30:12.	January 21 2006 10:14:14.	view | edit | publish
hypothesismean1.wasp	November 16 2006 15:05:01.	September 28 2006 06:27:29.	view | edit | publish
hypothesismean2.wasp	October 06 2006 11:17:00.	September 28 2006 07:41:14.	view | edit | publish
hypothesismean3.wasp	October 06 2006 11:19:59.	September 28 2006 14:06:21.	view | edit | publish
hypothesismean4.wasp	October 06 2006 11:21:09.	September 29 2006 08:46:42.	view | edit | publish
hypothesismean5.wasp	November 02 2006 05:16:44.	November 02 2006 17:17:54.	view | edit | publish
hypothesismean6.wasp	November 02 2006 06:00:40.	November 02 2006 17:18:03.	view | edit | publish

The framework creates the Rmodule when the editor clicks publish

Homepage


[Select module]
Load Module
Home Page
Equation Plotter
Time Series Analysis
Financial Databases
Multiple Regression
Descriptive Statistics
Statistical Distributions
Hypothesis Testing
::Free Statistics and Forecasting Software::
:: Free Statistics Software (Calculator) - Web-enabled scientific services & applications ::
The non-commercial (academic) use of this software is free of charge. The only thing that is asked in return is to cite this software when results are used in publications.
All rights reserved. Academic license for non-commercial use only.
Wessa.net offers these software applications free of charge:
Mathematical Equation Plotter
Plots mathematical equations, statistical distributions, derived functions, cumulative functions, and apply numerical integration. Equations can be formulated in algebraic form, for instance: y=exp(a*sin(x)+b). The equation is sent through an interpreter and the analysis and equation chart is generated (in .png format).
Scientific Forecasting Software
Performs Univariate Box-Jenkins ARIMA modeling, forecasting, and various bootstrap simulation methods for the estimation of financial profit density functions according to the following strategies: Buy&Hold, Alexander's Filterrule, truncated Koyck lag-based MACD. Various types of time series analysis tools are available: (Partial) Auto Correlation Function, Spectral Analysis, Variance Reduction Matrix, Standard Deviation-Mean Plot, trimmed Skewness & Kurtosis, suspended rootogram displays, percentiles, concentration, histograms, foreward & backward running autocorrelation, ARMA parameter estimation, and much more.
Time Series Database
Use this Database to gain access to thousands of time series about financial markets. Note: this application is also available from within our Scientific Forecasting Software.
Multiple Regression Software
Performs Multiple Regression Equation Modeling with the following features: Ordinary Least Squares Estimation, Heteroskedasticity tests, Autocorrelation tests, Misspecification tests, Multicollinearity tests, Regression Charts, ANOVA tables, Goodness of Fit, and much more.
Several types of regression will be available in future.
Descriptive Statistics Software
The Free Statistics Calculator offers a wide range of descriptive and explorative types of statistical measures and analysis: Central Tendency, Average, Mean, Median, Variability, Interquartile Range, Concentration, Lorenz Curve, Gini Coefficient, Skewness, Kurtosis, Quartiles, Percentiles, Notched Boxplot, Histogram, Correlation, Partial Correlation, Rank Correlation (Spearman and Kendall), Simple Regression, Kernel Density Estimation, Harrell-Davis Quantiles, Bivariate KDE, Correlation Matrix, Stem-and-leaf plot, Explorative Data Analysis
Statistical Distributions
Features Random Number Generators, PPCC Plots (incl. Tukey lambda), and Statistical Distribution Fitting Modules (Maximum Likelihood) for a series of important distributions: Beta, Inverted Beta, Cauchy 1, Cauchy (2 parameters), Chi, Chi Square (1 parameter), Chi Square (2 parameters), Erlang, Exponential, Fisher F, Gamma, Inverted Gamma, Gumbel, Laplace, Logistic, Lognormal, Normal, Pareto, Power, Rayleigh, r-Distribution, Rectangular (Uniform), Student t, Triangular, and Weibull.
Statistical Hypothesis Testing Software
Offers statistical testing of a variety of hypotheses: Population Mean, Mean (critical value, p-value, type II error, sample size), Skewness/Kurtosis, Quasi Random-Walk
R modules
Registered authors can create, maintain, and publish R-based modules and make them freely available within the Wessa.net framework.
Academic citations
Latest News
Archive (old versions)
FAQ
About Wessa.net
Black&White
Blue Theme
Normal Fontsize
Increase Fontsize
Decrease Fontsize
Toggle underline
Server status page
History list
Illustrated history list
Descriptive Statistics Software

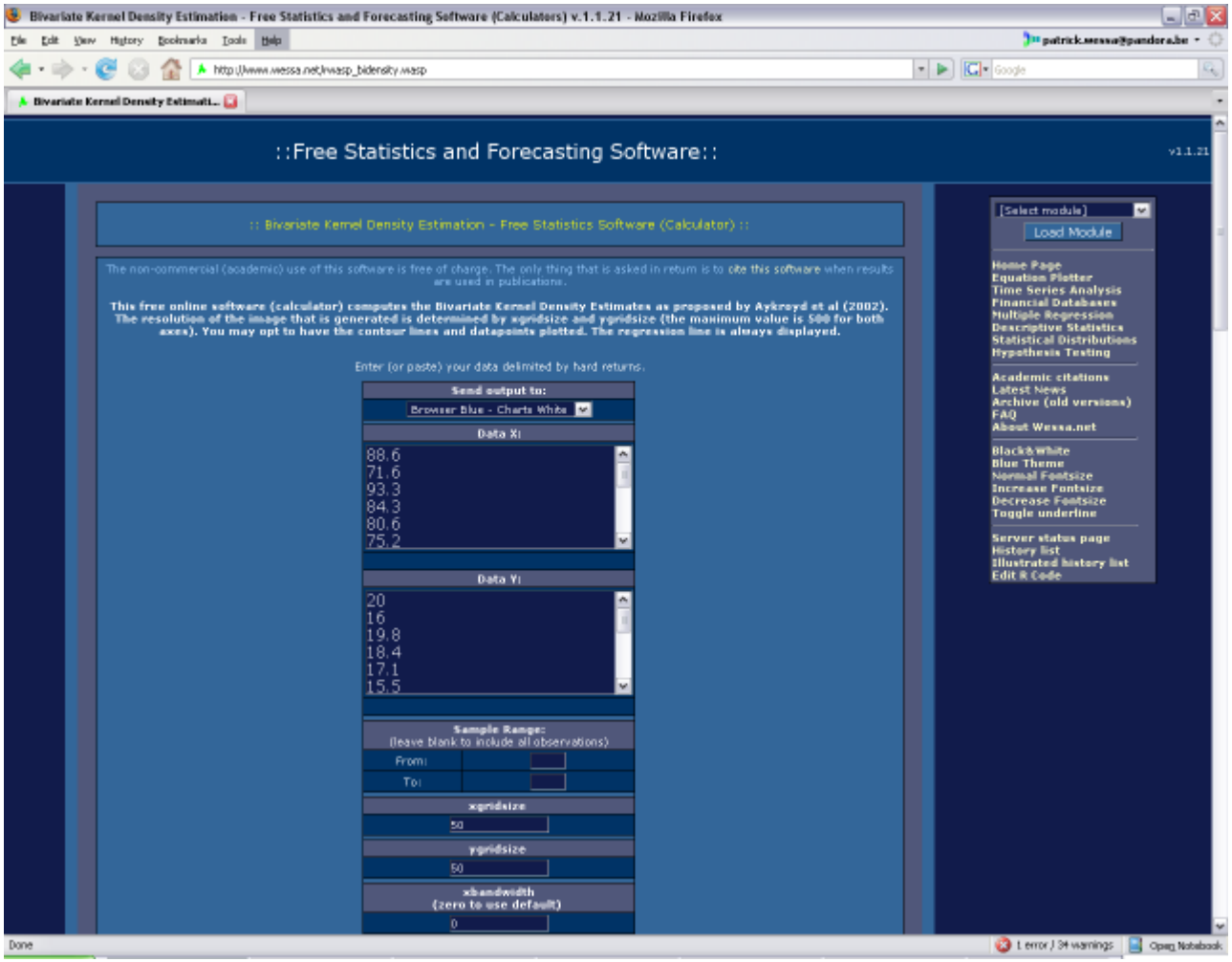
Descriptive Statistics page



Bivariate Descriptive Statistics - Ungrouped Data

Correlation	Pearson correlation, covariance, determination coefficient, scatter plot, etc...
Rank Correlation	Spearman Rank Order Correlation (corrected and non-corrected).
Simple Regression	general linear model, mean and variances, covariance, correlation, least squares estimation, parameters, response, significance, determination coefficient, ANOVA, residuals, autocorrelation, model selection, model
Bivariate Density	computes Bivariate Kernel Density Estimates
Kendall Rank Correlation	computes the Kendall tau Rank Correlation between two data series
Box-Cox Linearity Plot	computes the Box-Cox Linearity Plot
Linear Regression Graphical Model Validation	computes the Simple Linear Regression model (Y = a + b X) and various diagnostic tools from the perspective of Explorative Data Analysis
Back to Back Histogram	computes the Back to Back Histogram (sometimes called Bihistogram) for a bivariate dataset

Bivariate KDE (R Module)



Handling Requests

- Find R module (Google)
- User submits request (html form, HTTP POST)
- Webserver loads R module
- R module creates pre-processed R code
- Webserver directs request to R server (callback)
- R server invokes R engine, stores output
- Webserver gets output parses through template
- Webserver sends html reply to user
- User fetches pictures/logfiles from R server

What do people say?

- “Fantastic, this is a great resource”
- “Very useful.”
- “Lifesaver!”
- “I think that you have done an excellent work”
- “I think that having the R source code is a good idea.”
- “Very simple in use, useful and nice-looking! Keep developin it!”
- “I think that a lot of help us to own job.”
- “I think that...it is great. We (my 10 year old dtr. and I) used it for her science project--even she had an easy time with it. Thanks so much”
- ….. many more….

What else do they say?

- Many useful suggestions:
  - “There is a problem to open bitmap .png files”.

- “I think that...it can be improved”
- “close it down” ☹

R Modules …

- are (almost) “user friendly”
  - fontsize, color, underline
  - simple submission form
  - output in html, Word, Excel
  - text-only input (do we need to import data files?)
- are “safe to use”

  unlike DIE software
- are compatible with any http-enabled user agent
- “firewall friendly”
- are used by many [statistics available, REPEC]

R Modules ...

- are “indexable”, hence “findable”
  - hierarchy of hyperlinks
  - meta tags, titles, descriptions
  - archive of old versions
  - fast loading, pure html
- make “Business/Marketing Sense”

R Modules have “impact”

:: Free Statistics Software (Calculator) - Web-enabled scientific services & applications ::

The non-commercial (academic) use of this software is free of charge. The only thing that is asked in return is to **cite this software** when results are used in publications.

Wessa.net has been used in empirical research and cited in the following articles :

- Abouchami, W. (1), Hofmann, A.(1), Galer, S. (1), Frey, F. (2), Eisele, J.(1) & Feigenson, M. (3)
  Lead Isotopes Reveal Bilateral Asymmetry and Vertical Continuity in the Hawaiian Mantle Plume
  Nature, vol. 434, April 14, 2005, pp. 851-856, 4 citations in Google Scholar(tm)
  (1) Max-Planck-Institut für Chemie, Mainz, Germany
  (2) Massachusetts Institute of Technology, Cambridge, US
  (3) Department of Geological Sciences, Rutgers University, New Brunswick, US

- Solonen, T. (*)
  Breeding of the Tawny Owl Strix aluco in Finland: responses of a southern colonist to the highly variable environment of the North
  Ornis Fennica, vol. 82 (3), 2005, pp. 97-106, Impact Factor 0.66
  (*)Luontotutkimus Solonen Oy, FI-00960 Helsinki, Finland

- Smith, S. B. (*), Norment, C. J. (*)
  Nocturnal activity and energetic condition of spring landbird migrants at Braddock Bay, Lake Ontario
  Journal of Field Ornithology, vol. 76 (3), 2005, pp. 303-310, Impact Factor 0.509 (in 2004)
  (*)Department of Environmental Science and Biology, SUNY College at Brockport, Brockport, New York 14420 USA

- Poncet, P. A. (1), Pfister, W. (2), Muntwyler, J. (2), Glowatzki-Mullis, M. L. (2), Gaillard, C. (2)
  Analysis of pedigree and conformation data to explain genetic variability of the horse breed Franches-Montagnes
  Journal of Animal Breeding and Genetics, vol. 123 (2), 2006, pp. 114-121, Impact Factor 0.856 (in 2004)

- Ruvinsky1 A. (1) and W. Ward1, (2)
  A Gradient in the Distribution of Introns in Eukaryotic Genes
  Journal of Molecular Evolution, vol. 63 (1), 2006, pp. 136-141, Impact Factor 3.519 (in 2005)
  (1) The Institute for Genetics and Bioinformatics, University of New England, Armidale, 2351, NSW, Australia
  (2) School of Mathematical, Statistics and Computer Sciences, University of New England, Armidale, 2351, NSW, Australia

- Tapio Solonen
  Overwinter population change of small mammals in southern Finland
  Annales Zoologici Fennici, vol. 43, 2006, pp. 295-302, Impact Factor 1.5 (in 2002)
  Luontotutkimus Solonen Oy, Neitsytsaarentie 7b B 147, FI-00960 Helsinki, Finland

- Koushik Sen, Manish A. Mamtani (*)
  Magnetic fabric, shape preferred orientation and regional strain in granitic rocks
  Journal of Structural Geology, vol. 28, 2006, pp. 1870-1882, Impact Factor 2.1 (in 2005)
  (*) Department of Geology & Geophysics, Indian Institute of Technology, Kharagpur 721302, West Bengal, India

- Langford Eric (*)
  Quartiles in Elementary Statistics
  Journal of Statistics Education, vol. 14, 2006, Number 3 (2006), www.amstat.org/publications/jse/v14n3/langford.html
  (*) California State University, Chico

- John R. Talbott (*)
  Size Matters: The Number of Prostitutes and the Global HIV/AIDS Pandemic
  thesis, September 18, 2006, www.africansagainstaids.org/Talbott%20Research%20Paper.doc

R Modules …

Part of menu in right panel

- can be changed on the fly

R Modules …

- feature session management:
  - “remembers” datasets
  - maintains “history lists”

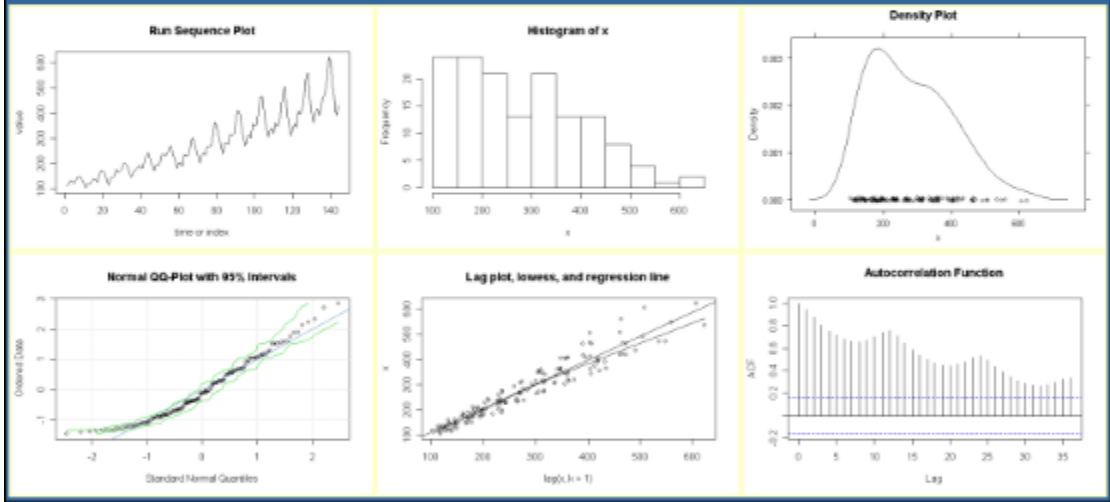
List of last 4 computations		Delete history
Server Date	Module	Command
Thu, 08 Feb 2007 08:53:45 -0600	Univariate Explorative Data Analysis	Print | Word | Excel | Blog this | Delete
Thu, 08 Feb 2007 08:01:04 -0600	Random Number Generator - Log-Normal Distribution	Print | Word | Excel | Blog this | Delete
Thu, 08 Feb 2007 07:55:43 -0600	Random Number Generator - Normal Distribution	Print | Word | Excel | Blog this | Delete
Thu, 08 Feb 2007 07:43:05 -0600	Start of session	-

Thu, 08 Feb 2007 08:53:45 -0600: Univariate Explorative Data Analysis

Blog this | Delete this item

Raw Input for R-2.3.1: input
Raw Output of R-2.3.1: output
Computing time: 5 seconds.
R Server: 'Herman Ole Andreas Wold' @ 193.190.124.10:1000

Descriptive Statistics	
# observations	144
minimum	104
Q1	180
median	265.5
mean	280.298611111111
Q3	360.5
maximum	622



Thu, 08 Feb 2007 08:01:04 -0600: Random Number Generator - Log-Normal Distribution

Blog this | Delete this item

Raw Input for R-2.3.1: input
Raw Output of R-2.3.1: output
Computing time: 6 seconds.
R Server: 'George Udny Yule' @ 193.190.124.7:81

Parameter	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10
	(SD)	(SD)	(SD)	(SD)	(SD)	(SD)	(SD)	(SD)	(SD)	(SD)
# simulated values	100	100	100	100	100	100	100	100	100	100
true mean	0	0	0	0	0	0	0	0	0	0

In Future, R Modules will…

- allow your work to be **archived***
- work like a **blog** (can be referenced in published articles)
- feature **discussion**
- collect additional **meta-data**
    - about usage
    - discussion
    - ‘taxonomy’
- allow you to **reproduce** your computations (compendium)
- allow you to **reuse** the code and meta data to create derived works

*feature under development

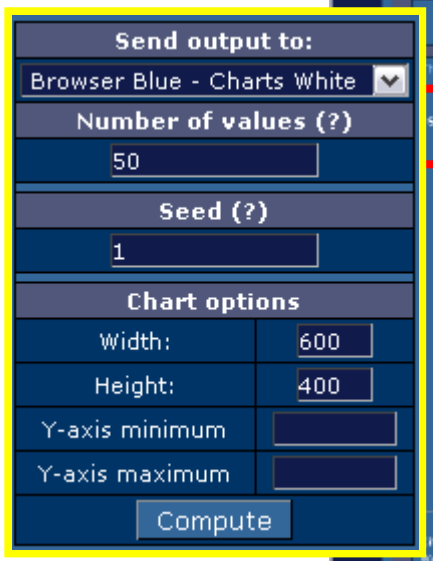
Compendium

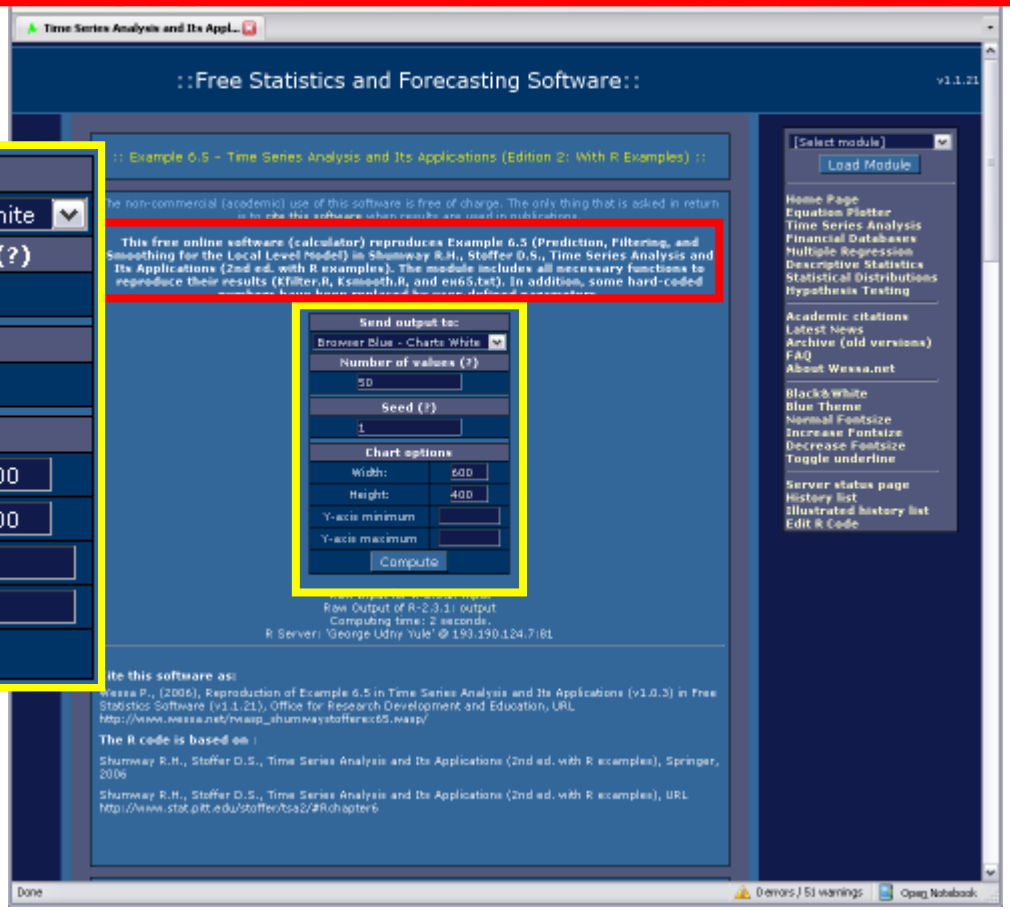
- An electronic Article that includes the Data and Software to reproduce the results?
- An electronically archived Computation that includes the Data, Meta-data, and Software to reproduce, and reuse it? Meta-data contains discussions, and information about usability & findability. It makes the compendium a tool of collaboration and dissemination.

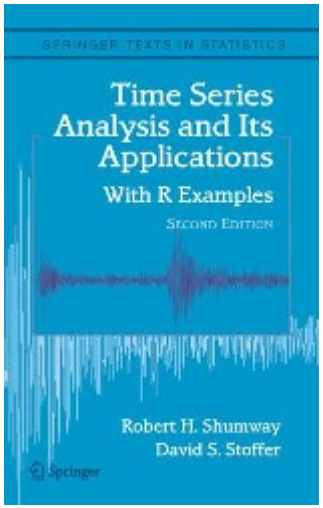
Could we make computations reproducible for anyone?

Yes, we can…

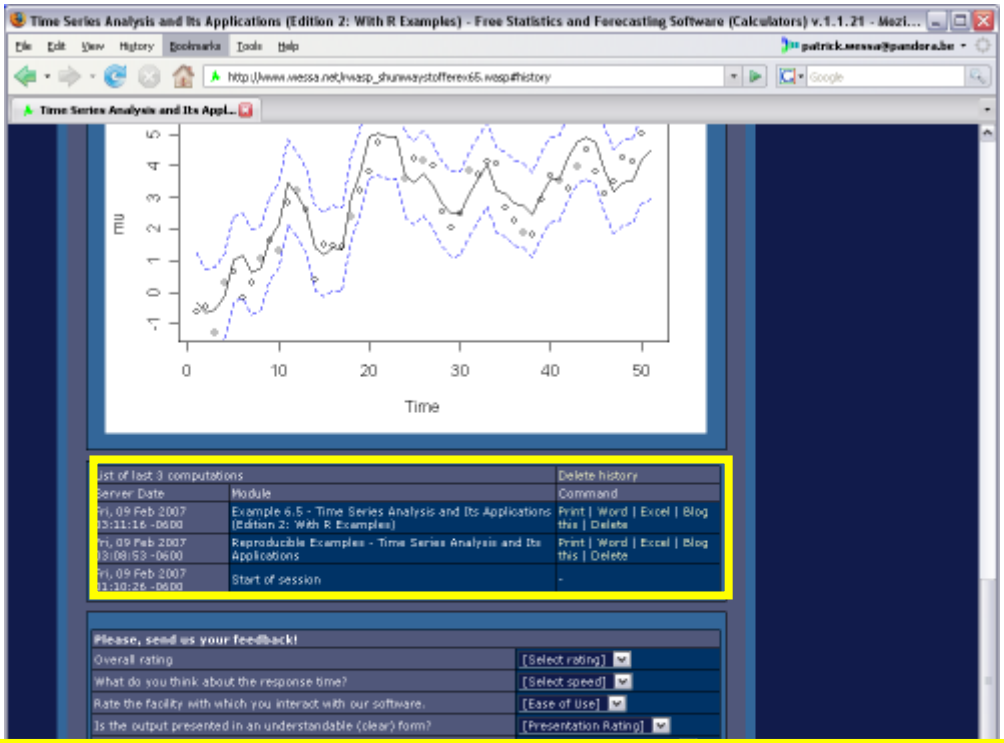
This free online software (calculator) reproduces Example 6.5 (Prediction, Filtering, and Smoothing for the Local Level Model) in Shumway R.H., Stoffer D.S., Time Series Analysis and Its Applications (2nd ed. with R examples). The module includes all necessary functions to reproduce their results (Kfilter.R, Ksmooth.R, and ex65.txt). In addition, some hard-coded numbers have been replaced by user-defined parameters.







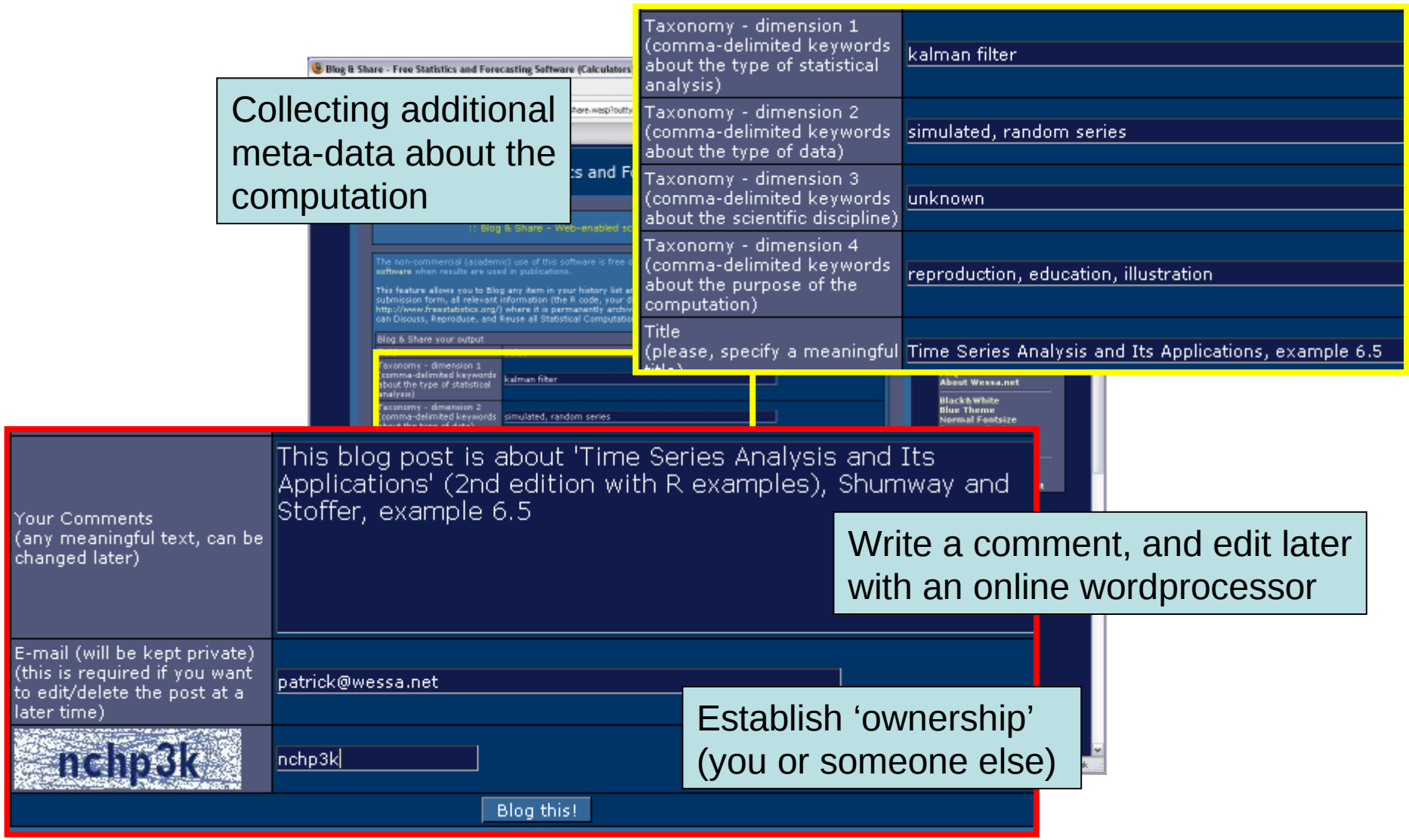
and when we Blog the computation…



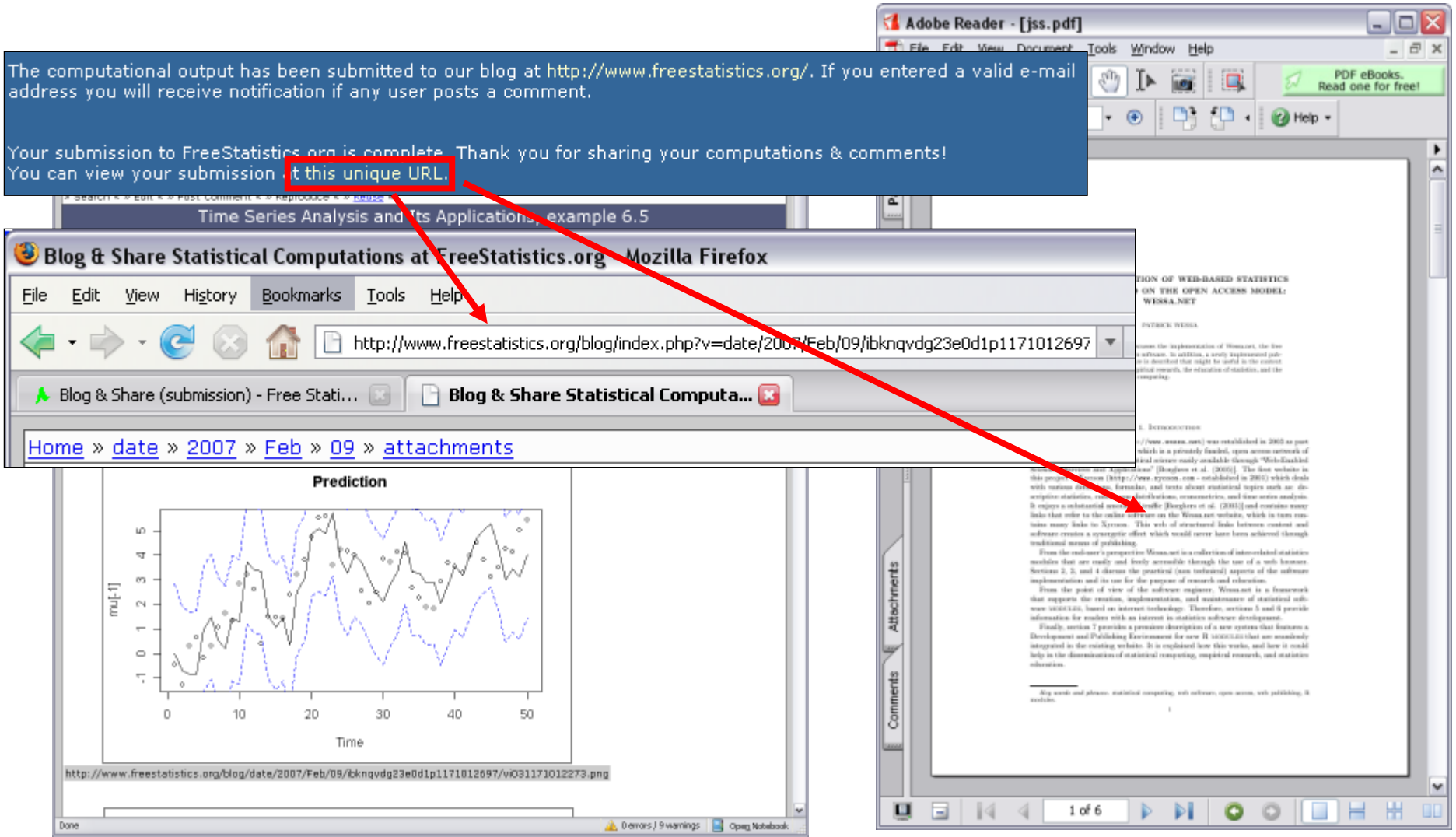
Blog this

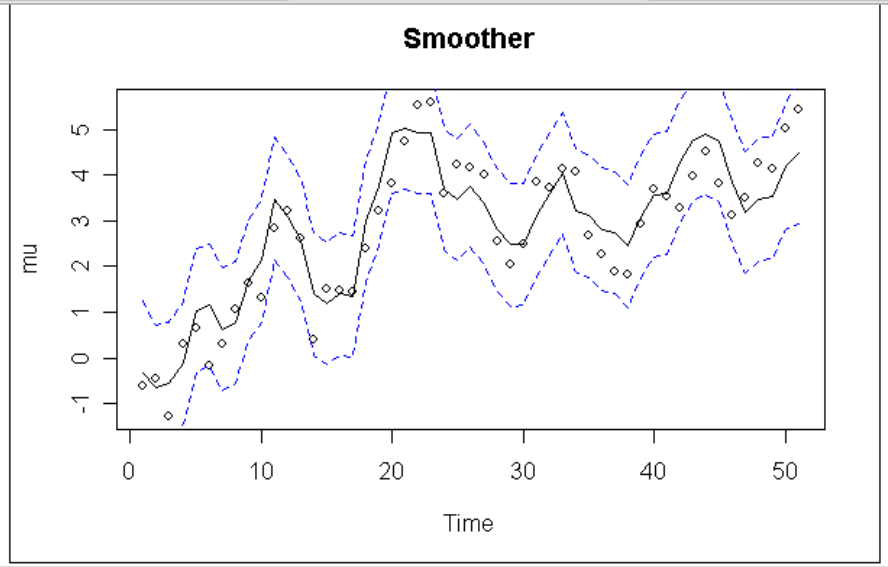
List of last 3 computations		Delete history
Server Date	Module	Command
Fri, 09 Feb 2007 03:11:16 -0600	Example 6.5 - Time Series Analysis and Its Applications (Edition 2: With R Examples)	Print | Word | Excel | Blog this | Delete
Fri, 09 Feb 2007 03:08:53 -0600	Reproducible Examples - Time Series Analysis and Its Applications	Print | Word | Excel | Blog this | Delete
Fri, 09 Feb 2007 01:10:26 -0600	Start of session	-

…and submit meta information…



…we get a “citable computation”





http://www.freestatistics.org/blog/date/2007/Feb/09/ibknqvdg23e0d1p1171012697/gql81171012273.png

Parameters:

par1 = 50 ; par2 = 1 ;

R code (references can be found in the software module):

```
par1 <- as.numeric(par1)
par2 <- as.numeric(par2)
Kfilter = function(num,y,A,mu0,Sigma0,Phi,cQ,cR){
Q=t(cQ)%*%cQ
R=t(cR)%*%cR
N=num+1
nseries=ncol(as.matrix(y))
yobs=matrix(0,N,nseries)
yobs[2:N,]=y # yobs is y with first row=zeros
xp=vector('list',N) # xp=x_t^{t-1}
Pp=vector('list',N) # Pp=P_t^{t-1}
xf=vector('list',N) # xf=x_t^t
Pf=vector('list',N) # Pf=x_t^t
innov=vector('list',N) # innovations
sig=vector('list',N) # innov var-cov matrix
like=0 # -log(likelihood)
xf[[1]]=mu0
Pf[[1]]=Sigma0
```

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patrick.wessa@pandora.be

http://www.freestatistics.org/blog/index.php?v=date/2007/Feb/09/ibknqvdg23e0d1p1171012697

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Time Series Analysis and Its Applications, example 6.5

Keywords:

R Software Module: rwasp_shumwaystofferex65.wasp (opens new window with default values)

Title produced by software: Example 6.5 - Time Series Analysis and Its Applications (Edition 2: With R Examples)

Date of computation: Fri, 09 Feb 2007 03:11:16 -0600

Text written by user:

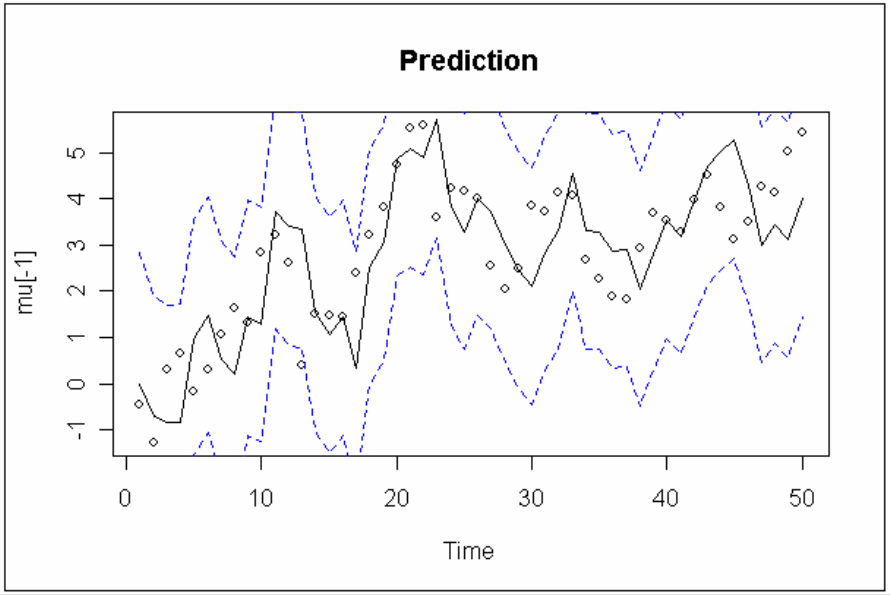
This blog post is about \'Time Series Analysis and Its Applications\' (2nd edition with R examples), Shumway and Stoffer, example 6.5

Output produced by software:

Computing time: 2 seconds.
R Server: 'George Udny Yule' @ 193.190.124.7:81

...which contains the output, the data, the software, and the meta-data.

Charts produced by software:

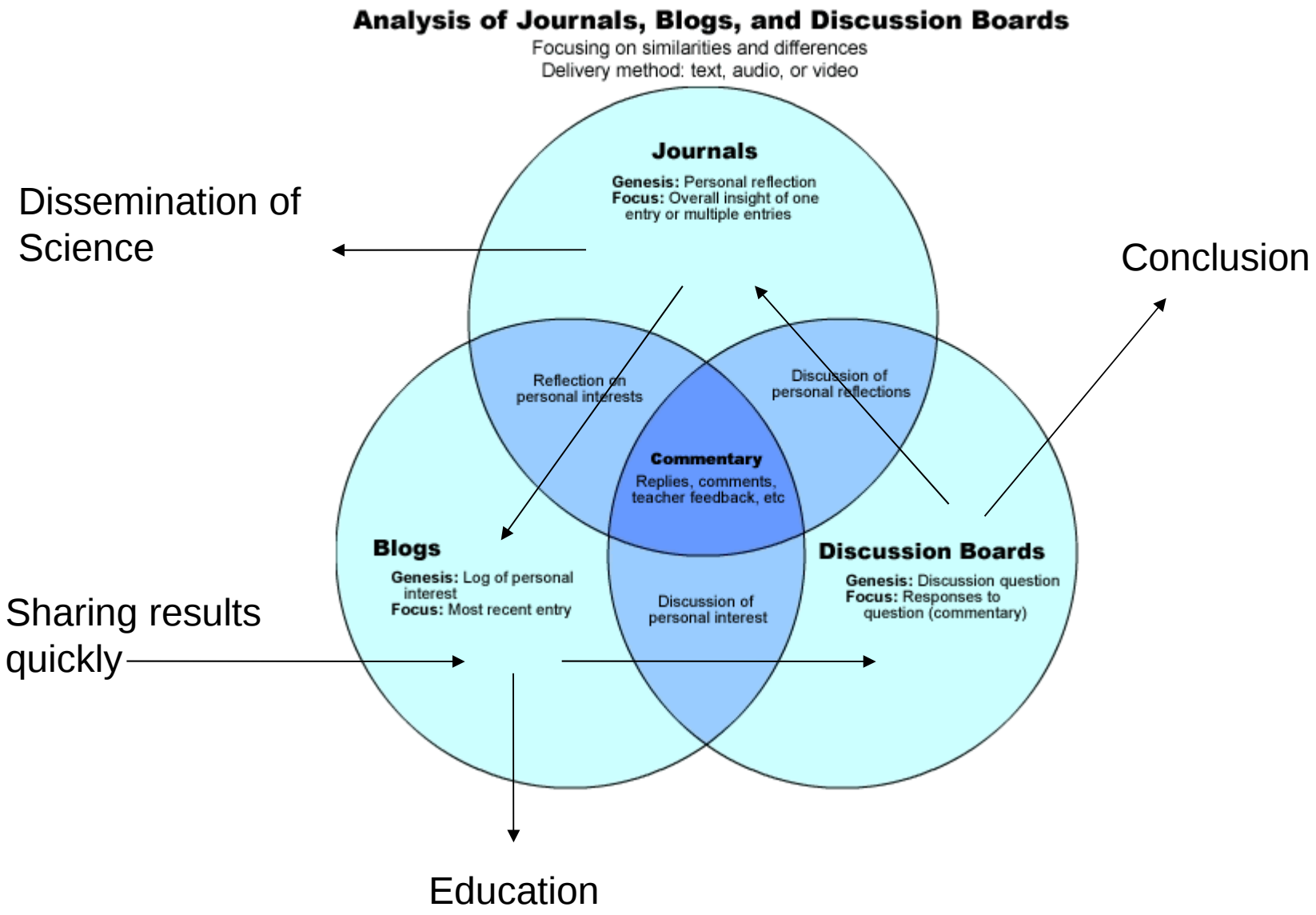


http://www.freestatistics.org/blog/date/2007/Feb/09/ibknqvdg23e0d1p1171012697/vi031171012273.png

Done

0 errors / 9 warnings

Open Notebook



http://moodle.org/mod/forum/discuss.php?d=44830

New types of MDB-driven applications

- Automatic creation of reference manuals (with cross-linking)
- On the fly Casebook creation
- Feedback administration system
  - Usability (GUI)
  - Bug reporting
  - Citation tracking
  - Refereeing
- MCMC Queuing (performance statistics)
- Collaborative Research & Learning (intelligent caching)
- Compendium Publishing

Future development

- Queue Management for MCMC
- Special apps require special UI:
  - Rich (Rpad-like) GUIs for graphics
  - Zelig
- Data import (SPSS, SAS, …)
- Upload of large databases (=> dataframes always available)
- Sweave integration
- RSS/Atom support (keyword dependent)