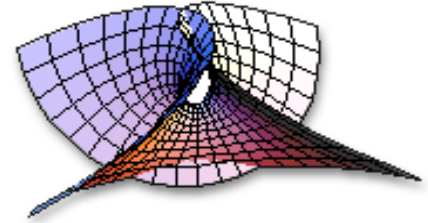
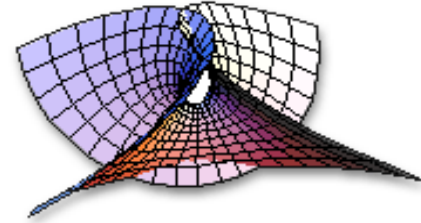


Commercial meets Open Source — Tuning STATISTICA with R

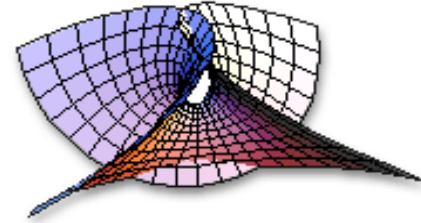
Christian H. Weiß



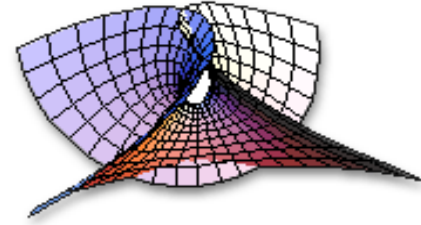
* Introduction *



Extremely powerful environment for statistical computing!



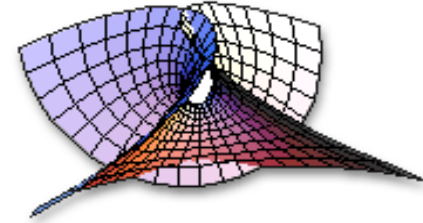
- ▶ Provides packages for different areas (data mining, econometrics, biostatistics, etc.).
- ▶ Offers methods from different disciplines (time series analysis, statistical process control, bootstrapping, cluster analysis, etc.).
- ▶ Reflects state-of-art in statistical sciences.
- ▶ Freely available!



... on the other hand:

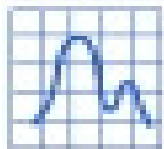
R is not particularly user-friendly!

- ▶ **No graphical user interface, where whole repertoire of methods fully integrated.**
- ▶ Methods not available for users, who have not learnt the R language.
- ▶ No powerful spreadsheet environment, which enables intuitive way of data manipulation.



⇒ **Potential users from applied sciences and industry often do not have the heart to work with R!**

Users often prefer the comfort of a commercial package like STATISTICA.



StatSoft®

STATISTICA

Statistics menu:

- Basic Statistics/Tables
- Multiple Regression
- ANOVA
- Nonparametrics
- Distribution Fitting
- Advanced Linear/Nonlinear Models**
 - General Linear Models
 - Generalized Linear/Nonlinear Models
 - General Regression Models
 - General Partial Least Squares Models
 - NIPALS Algorithm (PCA/PLS)
 - Variance Components
 - Survival Analysis
 - Nonlinear Estimation
 - Fixed Nonlinear Regression
 - Log-Linear Analysis of Frequency Tables
 - Time Series/Forecasting**
 - Structural Equation Modeling
- Multivariate Exploratory Techniques
- Industrial Statistics & Six Sigma
- Power Analysis
- Automated Neural Networks
- PLS, PCA, Multivariate/Batch SPC
- Variance Estimation and Precision (VEPAC)
- Statistics of Block Data
- STATISTICA Visual Basic
- Batch (ByGroup) Analysis
- Probability Calculator

Table:

	1			
	DAX			
1	1628,75			
2	1613,63			
3	1606,51	1678,6	1718	24
4	1621,04	1684,1	1708,1	24
5	1618,16	1686,6	1723,1	24
6	1610,61	1671,6	1714,3	24
7	1630,75	1682,9	1734,5	24

Graph: variable: DAX

Transformations of Variables: EuStockMarkets.sta

OK (Transform selected series)

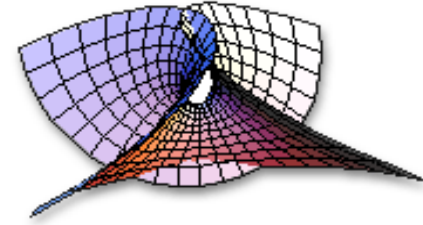
Lock	Variable	Long variable (series) name
L	DAX	

Number of backups per variable (series): 3

Save variables Delete

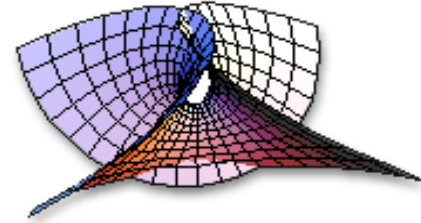
x=f(x) Smoothing x=f(x,y) Shift Difference, integrate Fourier Review & plot Autocorr Descriptives

Review highlighted variable Plot Label data points with



⇒ **Idea:**

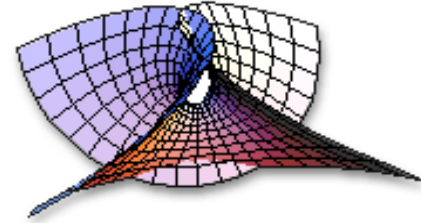
**Combine the power of R
with the
comfort of STATISTICA!**



Idea:

Use STATISTICA as an **easily operated interface** with a respectable **basic equipment of statistical procedures**.

Integrate **specialised statistical procedures and sophisticated techniques** offered by R into the user interface of STATISTICA.



Idea:

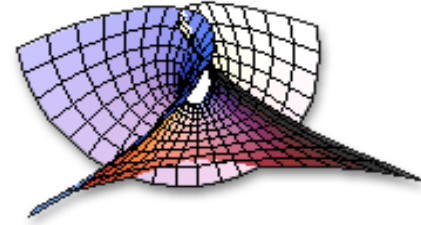
The user does data analysis in *STATISTICA*, using the readily available methods,

and

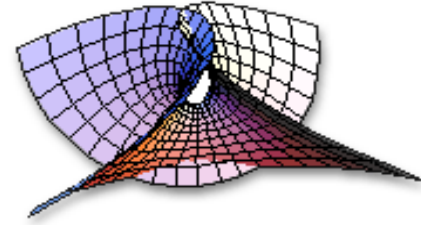
using **macros** written in Visual Basic, which access R for advanced computations.

⇒ **Use power of R**

without the need to learn the R language!

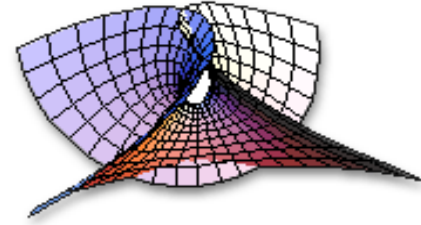


* Procedure *



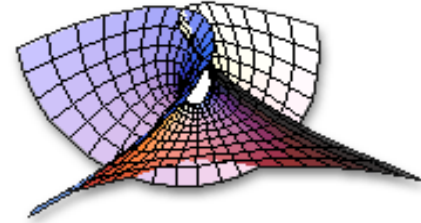
Required:

- ▶ Base version of **STATISTICA** with its **Visual Basic** development environment;
- ▶ **R** together with necessary packages;
- ▶ **R DCOM Server** of Baier & Neuwirth (2007)



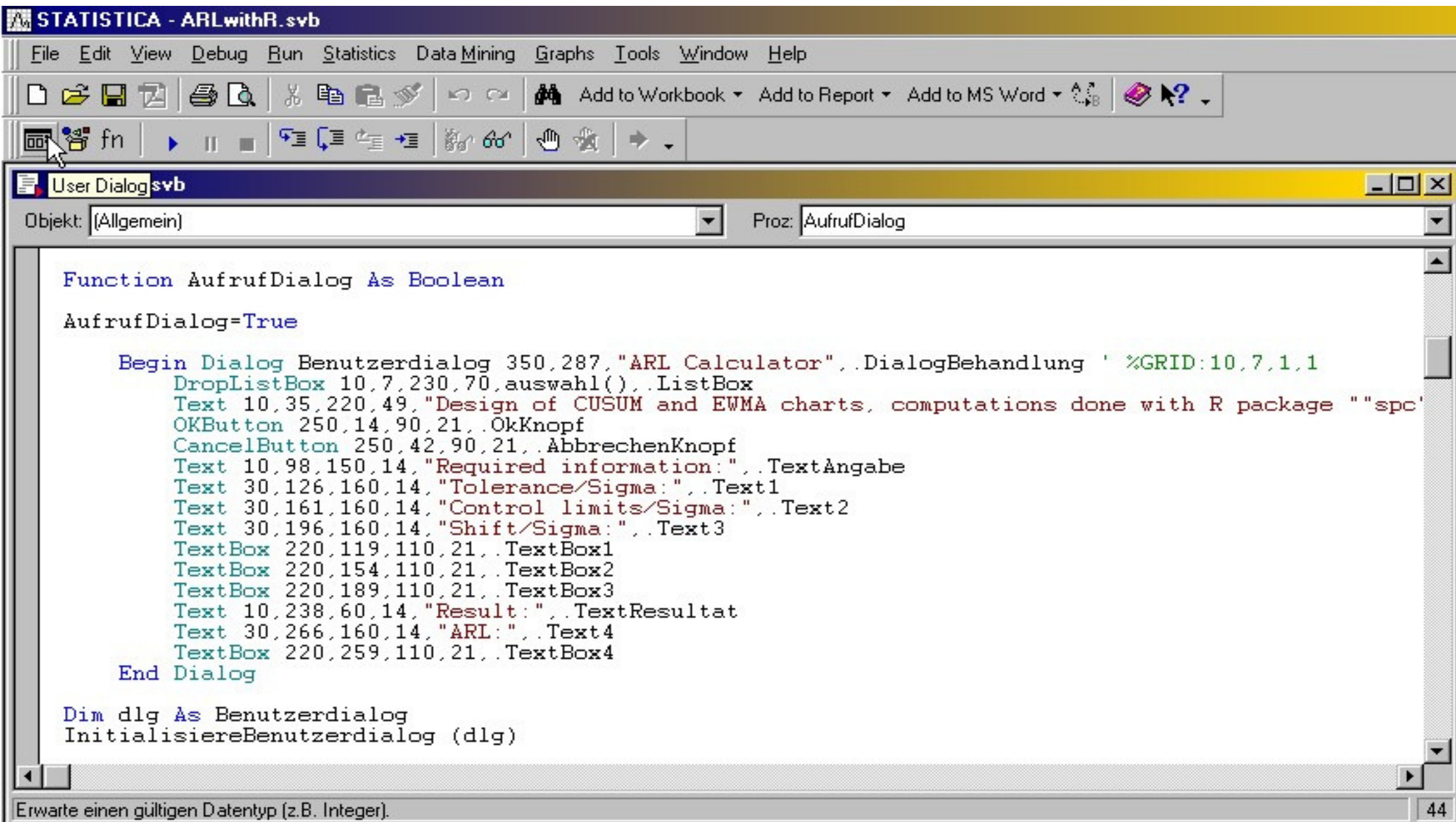
After having installed
STATISTICA, R, R DCOM Server, ...

the remaining steps
(programming & application)
are done within
the user-interface of STATISTICA.



How can we write a STATISTICA macro, which is able to access functionalities offered by R?

STATISTICA and R – Christian H. Weiß



The screenshot shows the STATISTICA software interface with a VBA User Dialog script open. The window title is "STATISTICA - ARLwithR.svb". The menu bar includes File, Edit, View, Debug, Run, Statistics, Data Mining, Graphs, Tools, Window, and Help. The toolbar contains various icons for file operations and data management. The main window is titled "User Dialog.svb" and shows the following VBA code:

```
Objekt: (Allgemein)      Proz: AufrufDialog

Function AufrufDialog As Boolean

    AufrufDialog=True

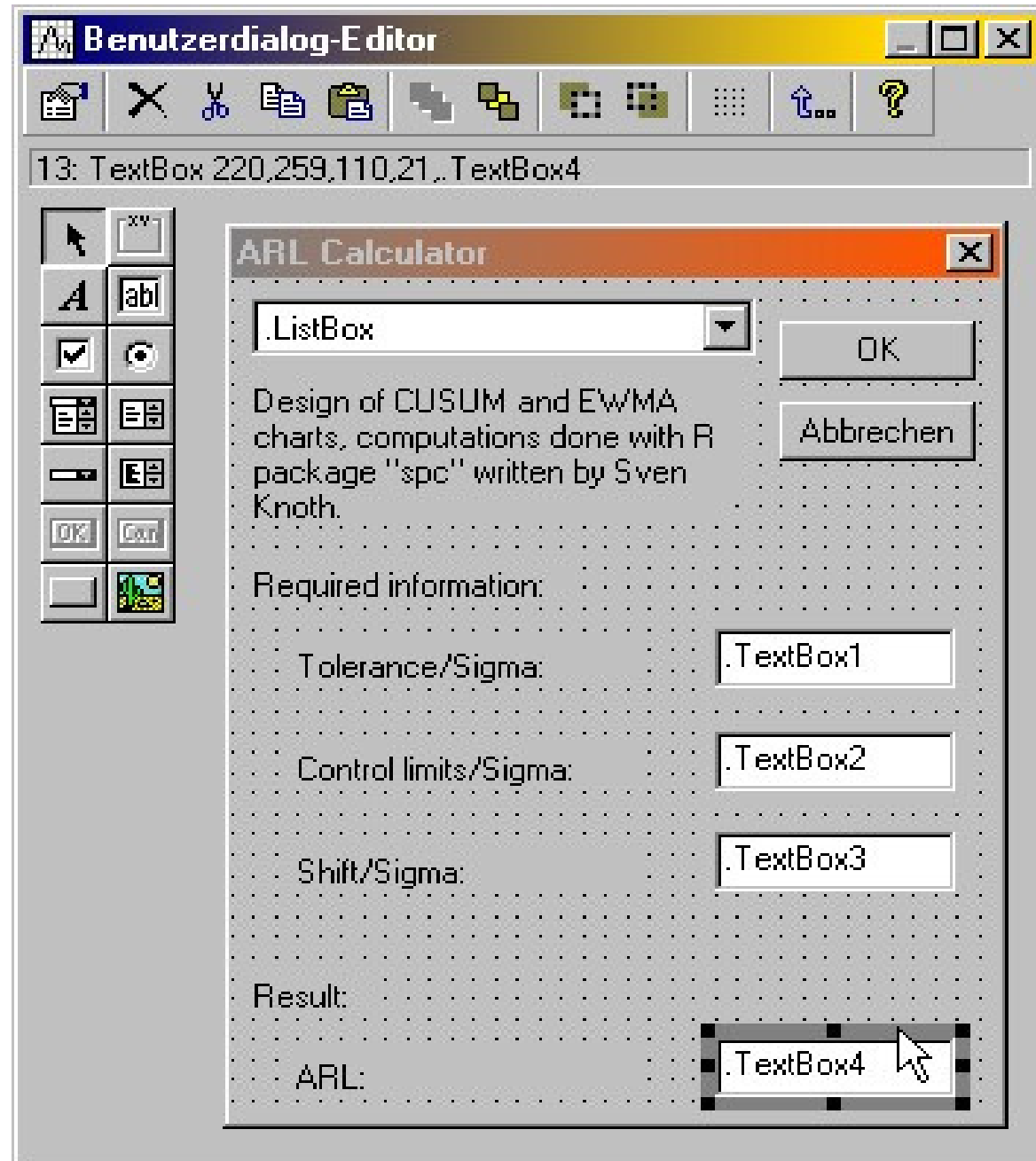
    Begin Dialog Benutzerdialog 350,287,"ARL Calculator",.DialogBehandlung ' %GRID:10,7,1,1
        DropListBox 10,7,230,70,auswahl(),.ListBox
        Text 10,35,220,49,"Design of CUSUM and EWMA charts, computations done with R package ""spc"
        OKButton 250,14,90,21,.OkKnopf
        CancelButton 250,42,90,21,.AbbrechenKnopf
        Text 10,98,150,14,"Required information:",.TextAngabe
        Text 30,126,160,14,"Tolerance/Sigma:",.Text1
        Text 30,161,160,14,"Control limits/Sigma:",.Text2
        Text 30,196,160,14,"Shift/Sigma:",.Text3
        TextBox 220,119,110,21,.TextBox1
        TextBox 220,154,110,21,.TextBox2
        TextBox 220,189,110,21,.TextBox3
        Text 10,238,60,14,"Result:",.TextResultat
        Text 30,266,160,14,"ARL:",.Text4
        TextBox 220,259,110,21,.TextBox4
    End Dialog

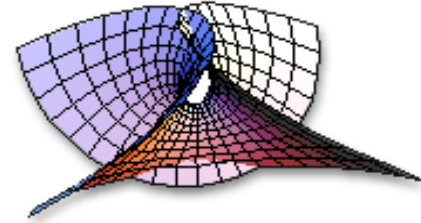
    Dim dlg As Benutzerdialog
    InitialisiereBenutzerdialog (dlg)

End Function
```

At the bottom of the window, a status bar displays the message: "Erwarte einen gültigen Datentyp (z.B. Integer)." The page number "44" is visible in the bottom right corner.

Visual Basic
environment allows to
easily design user
dialogs, ...

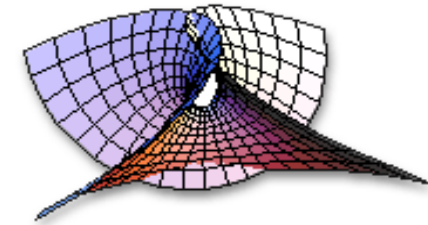




Compared to a "standard" macro,
only **one additional step** is necessary:

Include

R DCOM ("StatConnector") libraries.



STATISTICA - ARLwithR.svb

File Edit View Debug Run Statistics Data Mining Graphs Tools Window Help

Analysis Bar
 Dialog Editor...
 Object Browser... F2
 fn Function Browser...
References...
 Import STB...
 Import SCL...
 Macro
 Customize...
 Options...

ARLwithR.svb

Objekt: (Allgemein)

```

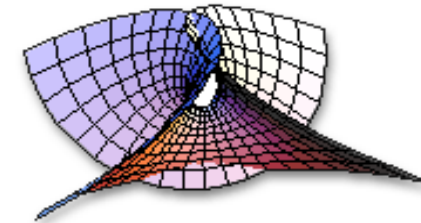
Dim auswahl(4) As String
Dim rzugriff As StatConnector

Sub Main

'Erstelle Serverobjekt
Set rzugriff = New StatConnector

'Fehlerbehandlung:
On Error GoTo fehler

'Starte R:
rzugriff.Init ("R")
rzugriff.EvaluateNoReturn ("library(spc)")
  
```



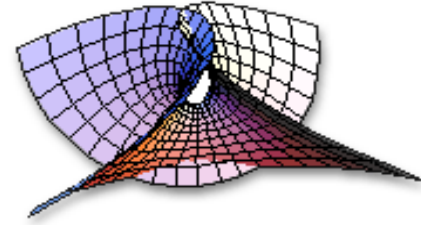
Verweise - ARLwithR.svb [X]

Verfügbare Verweise:

- STATISTICA By-Group Analysis Library (1.0)
- STATISTICA Link Analysis Library (1.0)
- StatConnControls (9.1)**
- StatConnectorClnr 1.0 Type Library (1.0)
- StatConnectorCommon 1.1 Type Library (1.1)
- StatConnectorSrv 1.1 Type Library (1.1)
- StatConnTools (10.0)
- IAS Helper COM Component 1.0 Type Library (1.0)
- IAS RADIUS Protocol 1.0 Type Library (1.0)
- 8021XConfig 1.0 Type Library (1.0)
- ABBYY FineReader 6.0 Type Library (6.0)
- Acrobat Access 3.0 Type Library (3.0)
- AcrobatEHelper 1.0 Type Library (1.0)
- Active DS Type Library (1.0)
- Active Setup Control Library (1.0)

Priorität

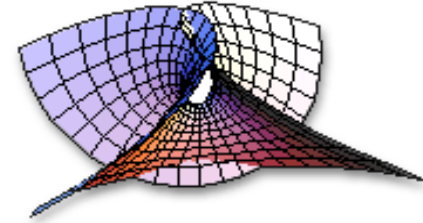
- StatConnControls (9.1) -
 Standort: C:\Programme\R\{D}COM Server\bin\StatConnControls.ocx
 Sprache: Standard Name:



Afterwards,
a new type of object is available:

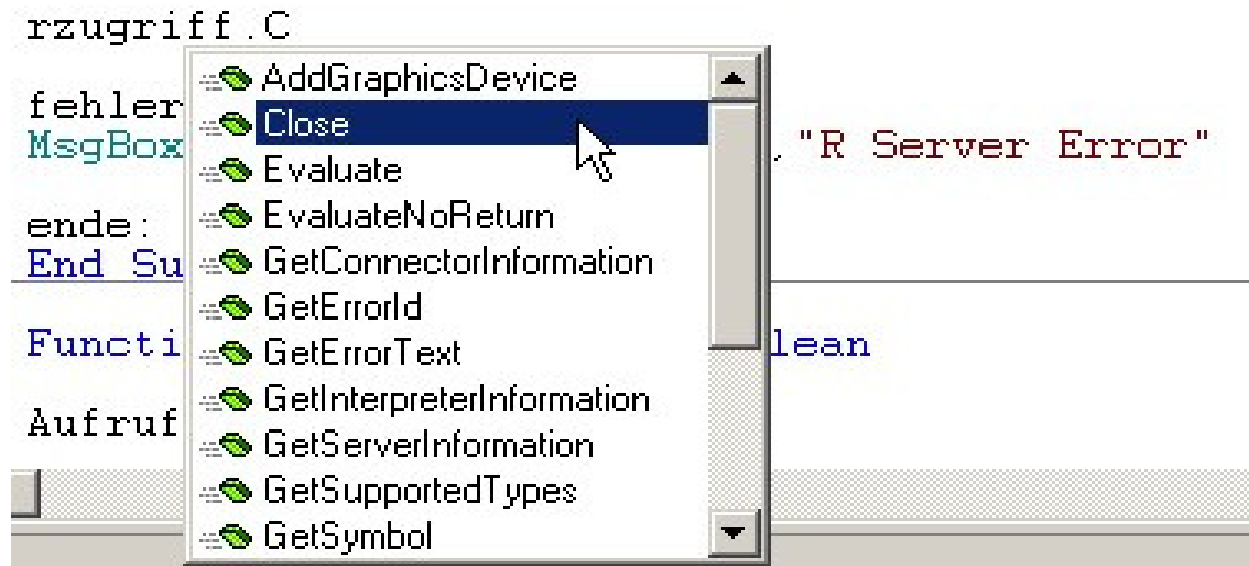
StatConnector object.

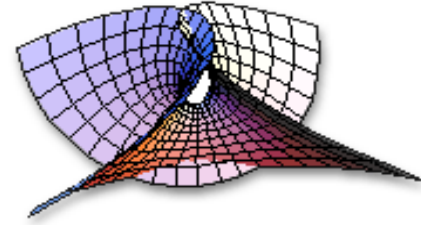
This object allows to communicate with R.



StatConnector-objects
offer a number of methods:

```
Dim rzugriff As StatConnector  
Set rzugriff = New StatConnector
```





Starting R:

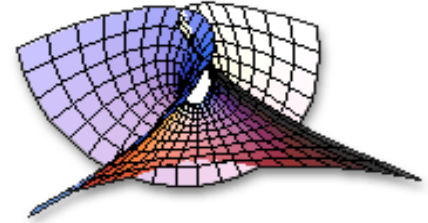
```
rzugriff.Init("R")
```

Receive possible error messages:

```
rzugriff.GetErrorText
```

Shut down connection:

```
rzugriff.Close
```



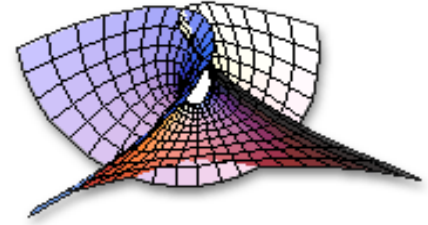
Most important methods:

```
obj.Evaluate("R command")
```

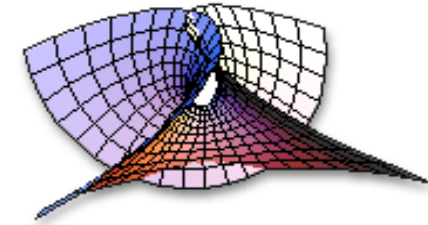
```
obj.EvaluateNoReturn("R command")
```

```
obj.SetSymbol("R variable", value)
```

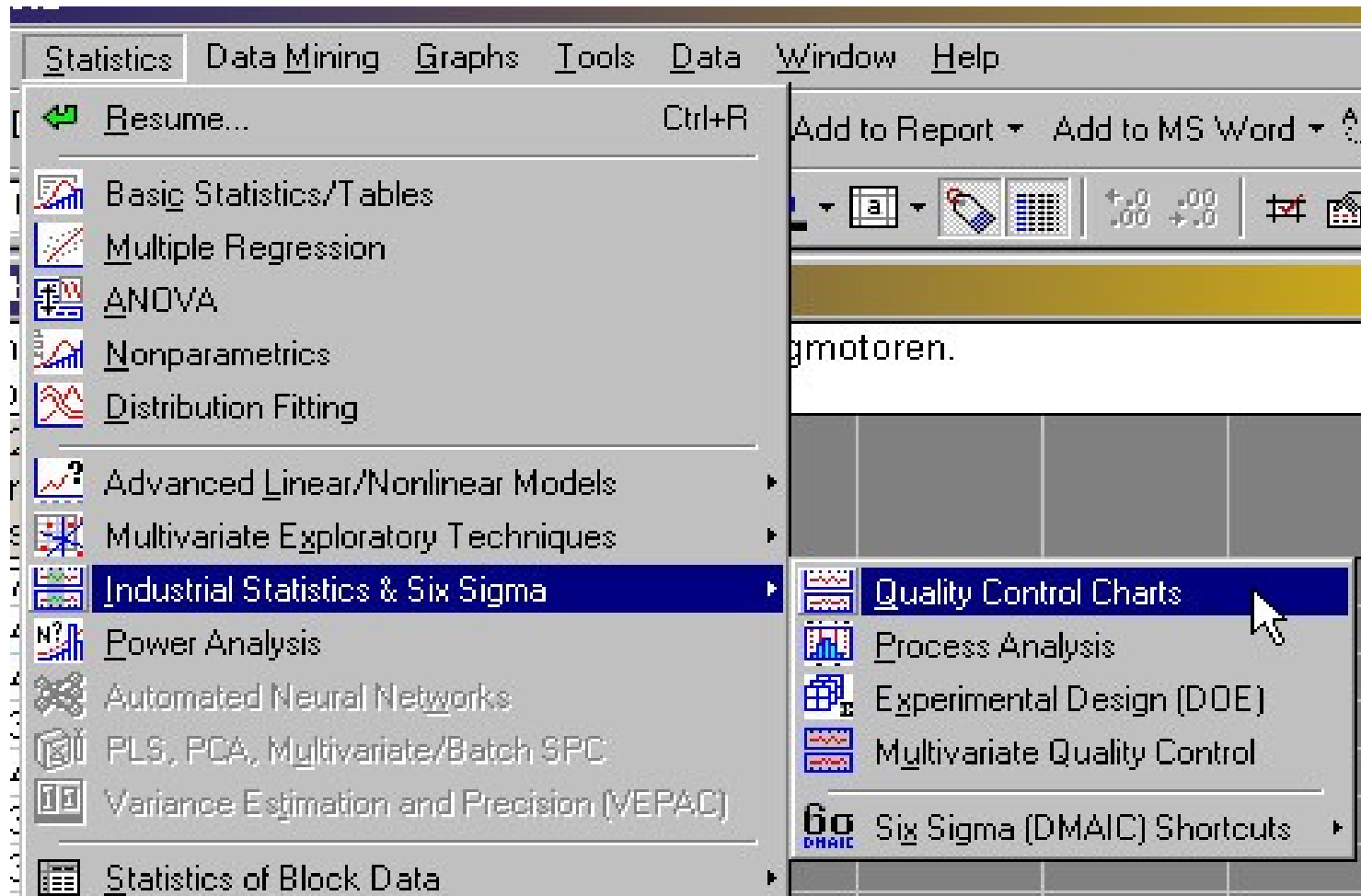
```
obj.GetSymbol("R variable")
```

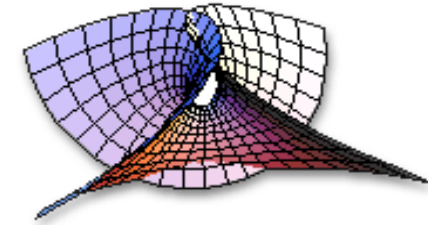


* Example 1 *

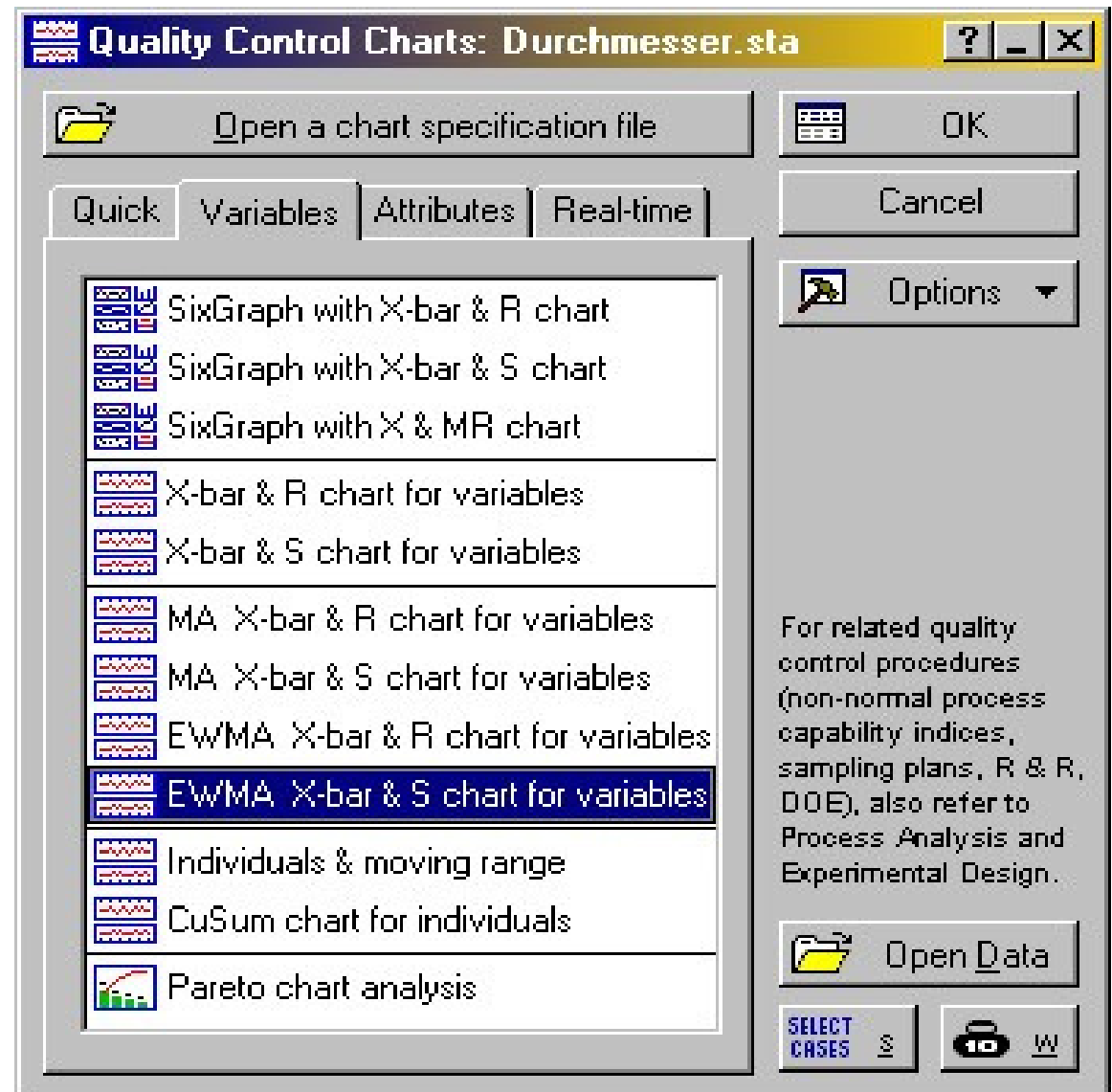


STATISTICA offers a number of approaches from SQC:





In particular,
STATISTICA offers a
 broad variety of
control charts,
 including, e.g.,
EWMA and **CUSUM**
charts.



STATISTICA and R – Christian H. Weiß

STATISTICA - Workbook2* - [EWMA X-bar and S Chart; variable: Durchmesser]

File Edit View Insert Format Statistics Data Mining Graphs Tools Workbook Window Help

Normal Graph

Data: Durchmesser.sta (2v by 200c)

Innerer Durchmesser (in mm) von Kolbenringen für Fahrzeugmotoren.
Quelle: Montgomery (2005), Kapitel 5.

	1 Stichprobe	2 Durchmesser
1	1	74,03
2	1	74,002
3	1	74,019
4	1	73,992
5	1	74,008
6	2	73,995
7	2	73,992
8	2	74,001
9	2	74,011
10	2	74,004
11	3	73,988
12	3	74,024
13	3	74,021
14	3	74,005
15	3	74,002
16	4	74,002
17	4	73,996

Workbook2* - EWMA X-bar and S Chart; variable: Durchmesser

EWMA X-bar and S Chart; variable: Durchmesser

Histogram of EWMA
EWMA X-bar: 74,004 (74,000); Sigma: ,01014 (,01000); n: 5.

Histogram of Std.Devs
Std.Dev.: ,00954 (,00940); Sigma: ,00346 (,00341); n: 5.

EWMA X-bar and S Chart; variable: Durchmesser

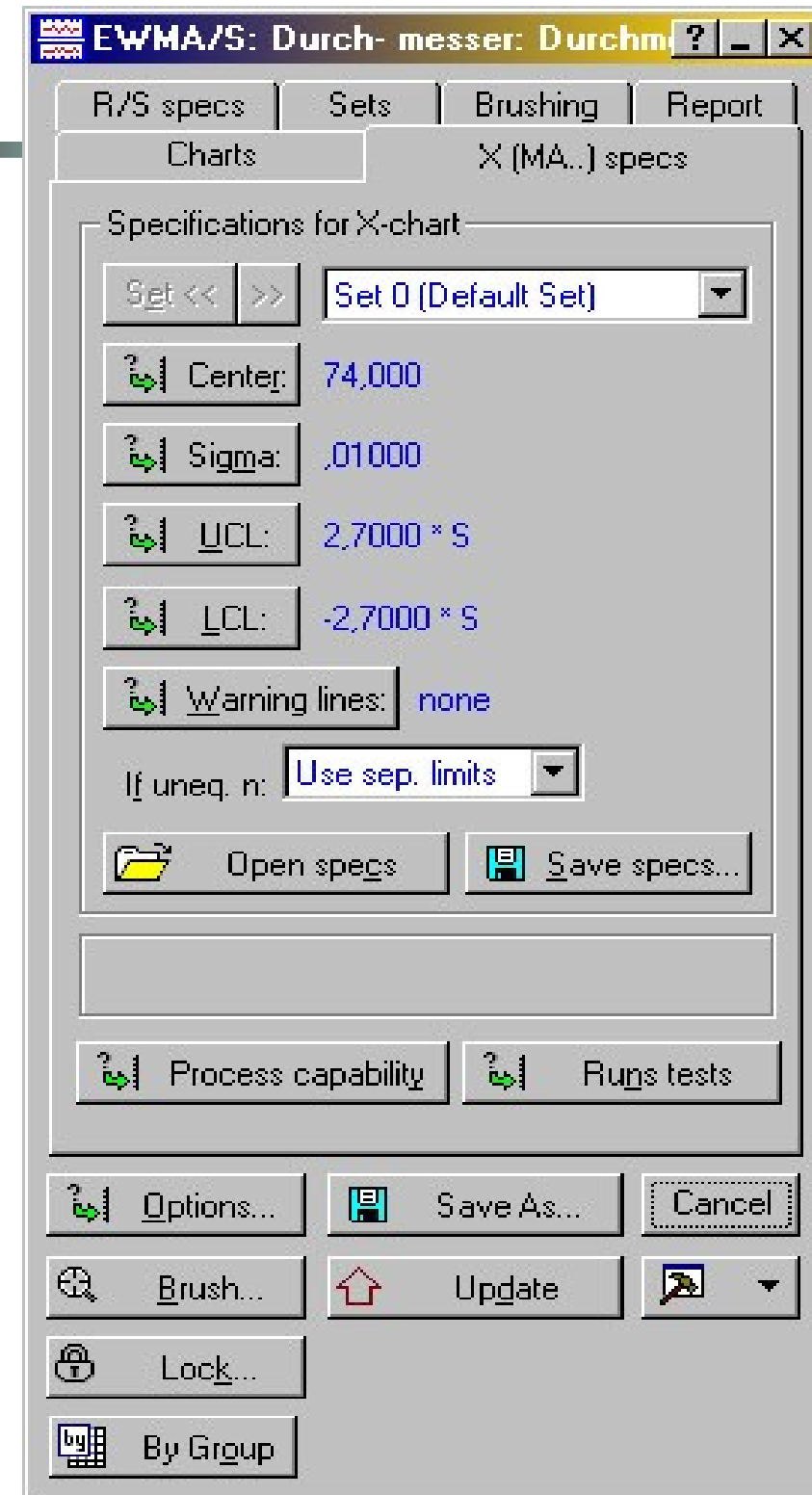
Reliable design of EWMA and CUSUM charts is not possible with simple $k\text{-}\sigma$ rule.

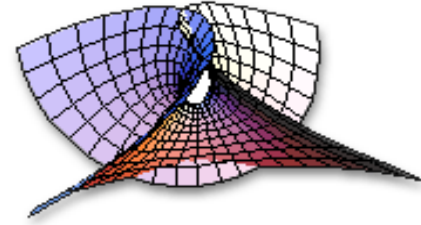
Instead:

Consider

ARL performance

of charts.

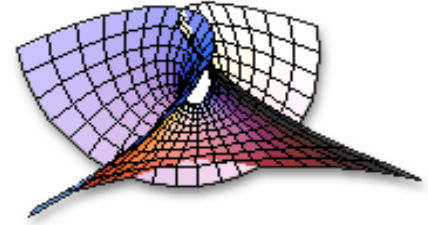




However: STATISTICA does not allow to compute ARLs!

But R does: spc package of Knoth (2007).

⇒ Tune STATISTICA with R!

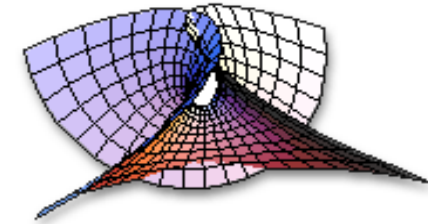


Macro “ARLwithR.svb”:

```
Dim robj As StatConnector  
Set robj = New StatConnector
```

Load spc-package:

```
robj.EvaluateNoReturn("library(spc)")
```



Compute ARL of
EWMA chart:

```
robj.Evaluate("
xewma.arl(l=0.1,
c=2.7, mu=0.0,
sided="two",
limits="vac1")
")
```

ARL Calculator

EWMA:ARLs

Design of CUSUM and EWMA charts, computations done with R package "spc" written by Sven Knoth.

Required information:

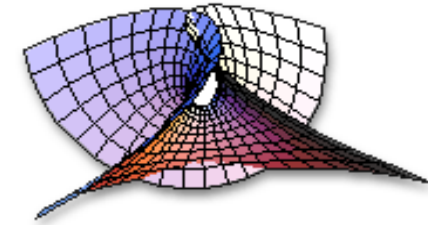
Lambda: 0,10

Control limits/Sigma: 2,7

Shift/Sigma: 0,0

Result:

ARL: 356,095096885



Compute limits of
EWMA chart:

```
robj.Evaluate("
xewma.crit(l=0.1, L
0=370,
sided="two",
limits="vac1")
")
```

ARL Calculator

EWMA: Control limits

Design of CUSUM and EWMA charts, computations done with R package "spc" written by Sven Knoth.

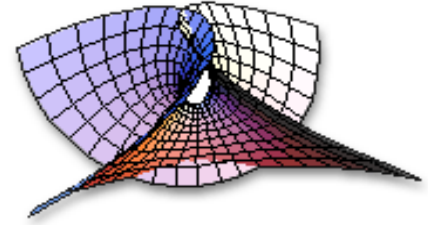
Required information:

Lambda: 0,10

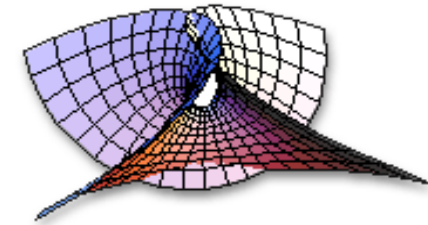
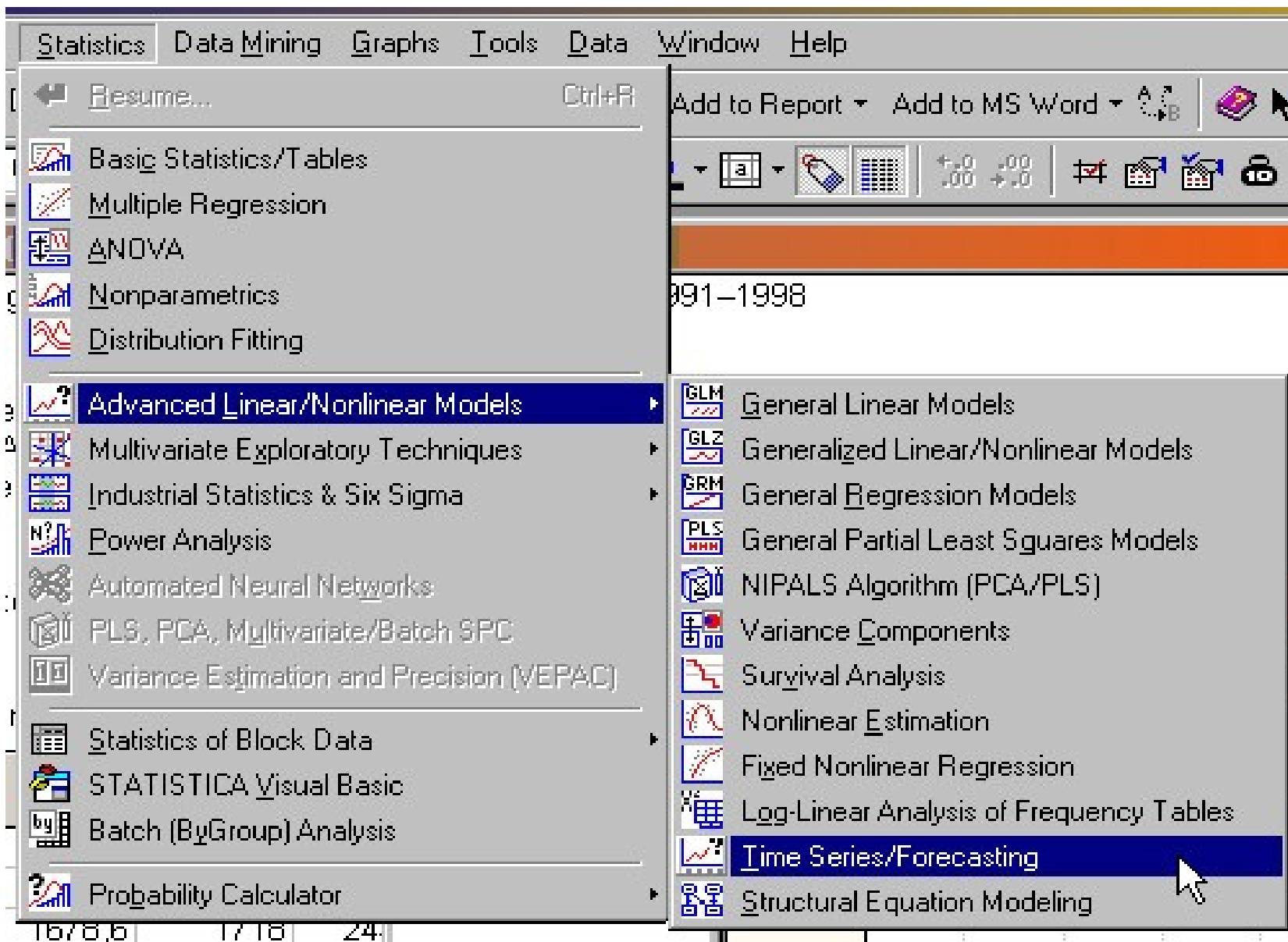
ARL_0: 370

Result:

Control limits/Sigma: 2,71420790882



* Example 2 *

The screenshot shows the STATISTICA software interface. The 'Statistics' menu is open, displaying various statistical analysis options. The 'Time Series/Forecasting' option is highlighted by the mouse cursor.

Statistics Data Mining Graphs Tools Data Window Help

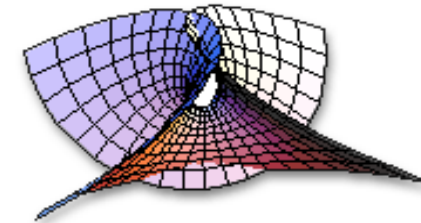
Resume... Ctrl+R

Add to Report Add to MS Word

1991–1998

- Basic Statistics/Tables
- Multiple Regression
- ANOVA
- Nonparametrics
- Distribution Fitting
- Advanced Linear/Nonlinear Models**
 - GLM General Linear Models
 - GLZ Generalized Linear/Nonlinear Models
 - GRM General Regression Models
 - PLS General Partial Least Squares Models
 - NIPALS Algorithm (PCA/PLS)
 - Variance Components
 - Survival Analysis
 - Nonlinear Estimation
 - Fixed Nonlinear Regression
 - Log-Linear Analysis of Frequency Tables
 - Time Series/Forecasting**
 - Structural Equation Modeling
- Multivariate Exploratory Techniques
- Industrial Statistics & Six Sigma
- Power Analysis
- Automated Neural Networks
- PLS, PCA, Multivariate/Batch SPC
- Variance Estimation and Precision (VEPAC)
- Statistics of Block Data
- STATISTICA Visual Basic
- Batch (ByGroup) Analysis
- Probability Calculator

1678,6 | 1718 | 24



Time Series Analysis: EuStockMarkets.sta [?] [-] [X]

Variables: **DAX-FTSE** [OK (transformations, autocorrelations, crosscorrelations, plots)]

Lock	Variable	Long variable (series) name
L	DAX	
L	SMI	
L	CAC	
L	FTSE	

Number of backups per variable (series): [↑] [↓]

[Save variables] [Delete highlighted variable]

Cancel [Options ▼] [SELECT CASES §] [Folder icon]

All selected variables (series) will be read into memory, and will be available for analysis. The analyses (e.g., transformations) will be performed on the highlighted variable.

Transformed variables (series) will automatically be added to the list. To edit a short or long variable name, double-click on it. To Lock variables (so that they will not be overwritten by subsequent transformations) double-click on the Lock column.

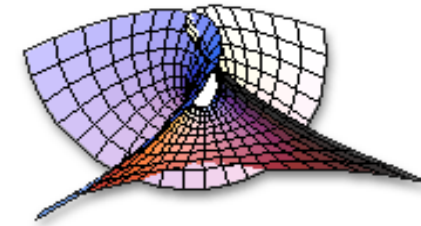
Quick | Missing data

[ARIMA & autocorrelation functions] [Seasonal decomposition (Census 1)]

[Interrupted time series analysis] [X11/Y2k (Census 2) - monthly] [- quarterly]

[Exponential smoothing & forecasting] [Distributed lags analysis]

[Spectral (Fourier) analysis]



Daily Closing Prices of Major European Stock Indices, 1991–1998

Description

Contains the daily closing prices of major

Workbook3* - Plot of variable: LogReturn

Workbook3*

Single Series ARIMA: EuStockMarkets.sta

OK (Begin parameter estimation)

Lock	Variable	Long variable (series) name
L	LogReturn	=Dif(v5;1)

Cancel

Options

By Group

Number of backups per variable (series): 3

Save variables

Delete

Quick | Advanced | Autocorrelations | Review series

ARIMA model parameters

Estimate constant

Seasonal lag: 12

p - Autoregressive: 2

P - Seasonal: 1

q - Moving aver.: 4

Q - Seasonal: 3

Transform variable (series) prior to analysis

Natural Log

Power transform: 2.0

Difference 1. Lag: 0

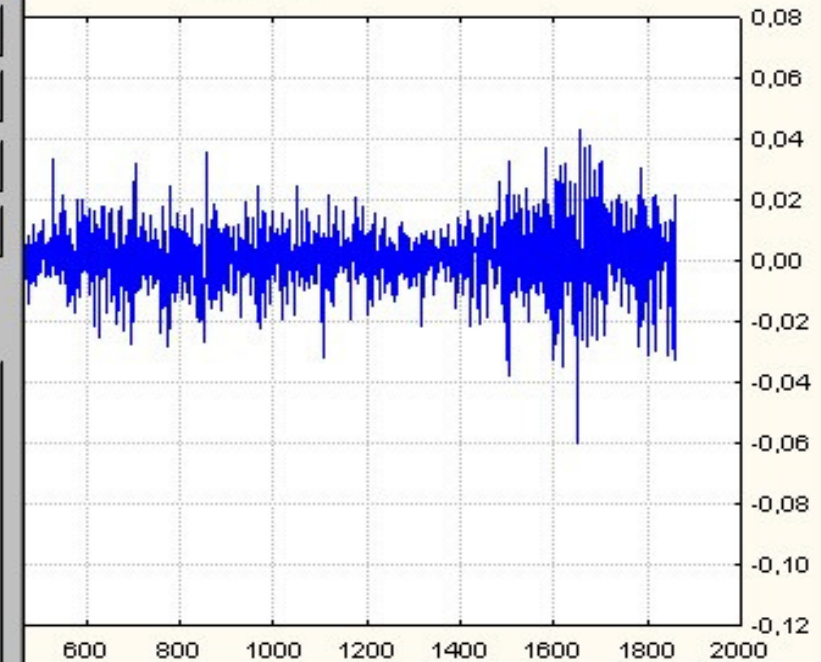
N of passes: 0

2. Lag: 0

N of passes: 0

Plot of variable: LogReturn

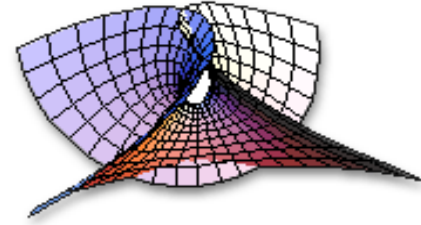
=Dif(v5;1)



Case Numbers

Autocorrelation Function (EuStockMarkets.sta)

Au



STATISTICA offers a large number of methods from time series analysis. E.g., it is able to fit any type of ARIMA model.

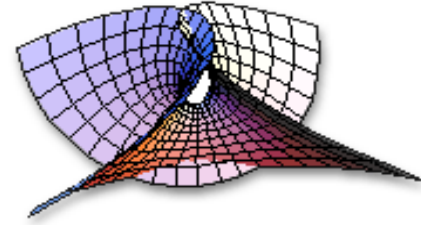
However,

STATISTICA not able to fit GARCH models!

But R does:

tseries package of Trapletti (2007).

⇒ **Tune STATISTICA with R!**



Macro “GARCHwithR.svb”:

```
Dim robj As StatConnector
```

```
Set robj = New StatConnector
```

Load tseries-package:

```
robj.EvaluateNoReturn("library(tseries)")
```

STATISTICA and R – Christian H. Weiß

The screenshot displays the STATISTICA software interface. The main window shows a data table with the following content:

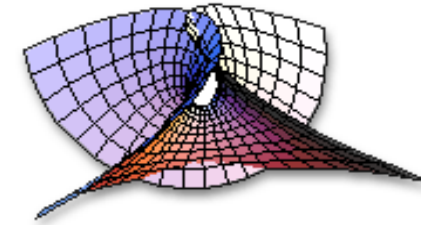
	1	
	DAX	
2	1613,63	
3	1606,51	
4	1621,04	
5	1618,16	
6	1610,61	
7	1630,75	
8	1640,17	
9	1635,47	
10	1645,89	
11	1647,84	
12	1638,35	
13	1629,93	
14	1621,49	
15	1624,74	
16	1627,63	
17	1631,99	
18	1621,18	
19	1613,42	

The description of the data is: "Daily Closing Prices of Major European Stock Indices, 1991–1998. Contains the daily closing prices of major European stock indices: Germany DAX (Ibis), Switzerland SMI, France CAC, and UK FTSE. The data are: ...".

An "Auswahl Datentabelle" dialog box is open, showing a file selection process. The selected file is "D:\Eigene Dateien\Kategoriale Zeitreihen\Vortraege\use...". The dialog box includes buttons for "OK", "Abbrechen", and "Dateien...".

The R script in the background includes the following code:

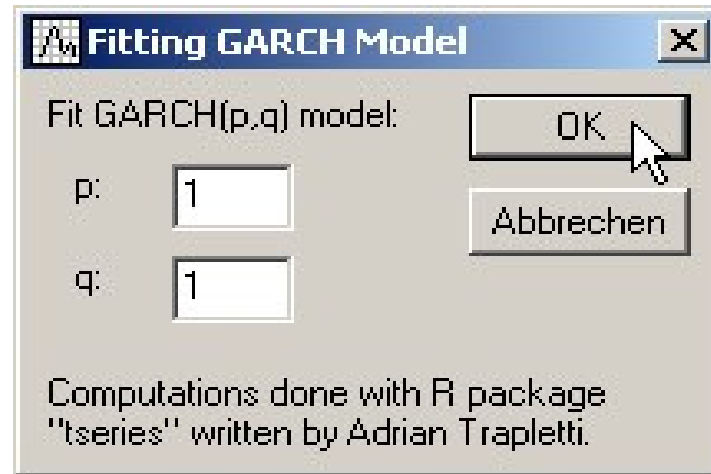
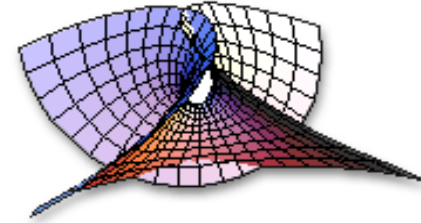
```
Objekt: (Allgemein)  
  
Dim Ncase As Long  
Dim Nvars As Long  
Dim kopie As Spreadsheet  
Dim ausgabe As Spreadsheet  
Dim covmatrix As Spreadsheet  
Dim residuals As Spreadsheet  
Dim rzugriff As StatConnector  
  
Sub Main  
  
'status dient dazu, fest:  
'Berechnung irgendwo ein  
status=True  
  
'Erstelle Serverobjekt  
Set rzugriff = New StatConnector  
  
'Erstbestimmung...
```



Submit data to R,
assign it to
R variable called
“data”:

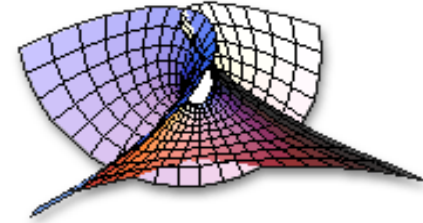
```
robj.SetSymbol  
("data",  
spreadst.Data)
```





Ask R to fit a GARCH(1,1) model:

```
robj.EvaluateNoReturn ("  
data.garch<-garch(data,order=c(1,1))  
")
```



Ask R for ...

maximized log-likelihood:

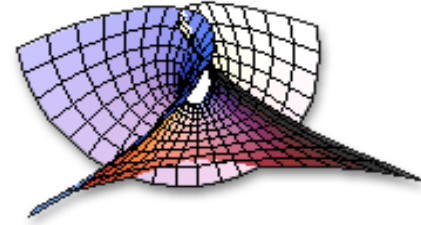
```
robj.Evaluate("logLik(daten.garch)")
```

estimated coefficients:

```
robj.Evaluate("coef(daten.garch)")
```

estimated covariance matrix:

```
robj.Evaluate("vcov(daten.garch)")
```



...

estimated residuals:

```
robj.Evaluate("residuals(daten.garch)")
```

Use these results

and prepare STATISTICA output:

STATISTICA and R – Christian H. Weiß

STATISTICA - Arbeitsmappe1* - [Fitted Model]

Datei Ansicht Statistik Data Mining Grafik Extras Arbeitsmappe Fenster Hilfe

Daten: EuStockMarkets_LogReturns.sta (6V * 1859F)

Daily Closing Prices of Major European Stock Indices, 1991–1998

Description
Contains the daily closing prices of major European stock indices: Germany DAX (Ibis), Switzerland SMI, France CAC, and UK FTSE. The data are sampled in business time, i.e., weekends and holidays are omitted.

Format
A multivariate time series with 1860 observations on 4 variables. The object is of class "mts".

Source
The data were obtained from the following source:
1 DAX

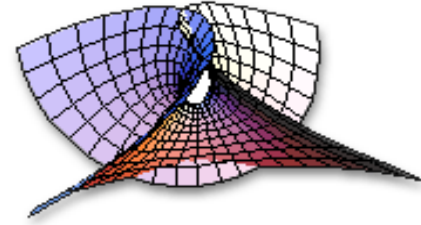
2	1613,63
3	1606,51
4	1621,04
5	1618,16
6	1610,61
7	1630,75
8	1640,17
9	1635,47
10	1645,89
11	1647,84
12	1638,35
13	1629,93
14	1621,49
15	1624,74
16	1627,63
17	1631,99
18	1621,18
19	1613,42

Arbeitsmappe1* - Fitted Model

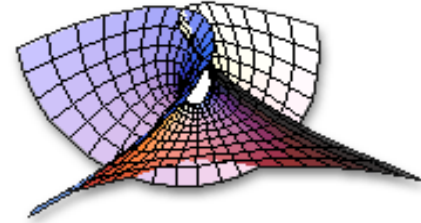
Fitted GARCH(1,1) model: AIC 11922,7751257722, BIC 11939,3568935303.

	1 Estimate	2 Std. error	3 t value	4 p value (2-sided)
a0	4,639E-6	7,5598E-7	6,13676	8,42E-10
a1	0,068329	0,0112507	6,07331	1,253E-9
b1	0,889067	0,0165202	53,817	0

Fitted Model Estimated Covariance Matrix Estimated Residuals



* Latest Developments *



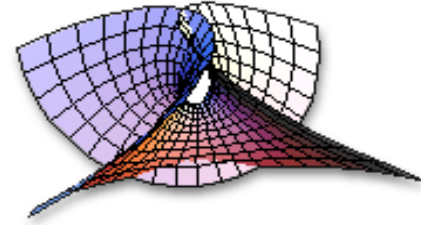
Above approach for accessing R can be realized **with any version** of STATISTICA.

Only few days ago, the new release

MR-3 for STATISTICA, version 8

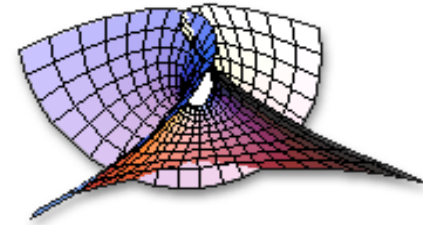
occurred, see `www.statsoft.com`.

→ several new approaches for interacting with R!



Essentially, four main innovations:

- ▶ Run R scripts straight from STATISTICA.
- ▶ Call R scripts from STATISTICA macro.
- ▶ New commands for R scripts to simplify data transfer between R and STATISTICA.
- ▶ New commands for SVB macros to simplify data transfer between R and STATISTICA.



Run R scripts from STATISTICA:

→ Simply open file with extension `.r` or `.s`.

Then run script like usual SVB macro.

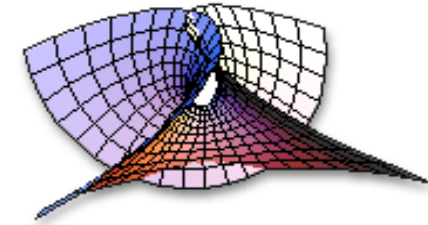
```
GARCHwithR.r
1 1  # 'Designed for particular data file EuStockMarkets_LogReturns.sta (selects variable 6)'.
2 2  library(tseries)

   p<-1
   q<-1
   varnr<-6
   n<-p+q+1
   model<-paste("Fitted GARCH(.",p,".",q,") model",sep="")

   daten<-ActiveDataSet[varnr:varnr]
   plot.ts(daten,type="l")
   daten.nrow<-nrow(daten)
   daten.garch <- garch(daten, order = c(p,q))
   daten.garch.logLik<-logLik(daten.garch)
   AIC<-2*daten.garch.logLik + 2*n
   #AIC<-sapply(daten.garch, AIC)
   BIC<-2*daten.garch.logLik + log(daten.nrow-1)*n

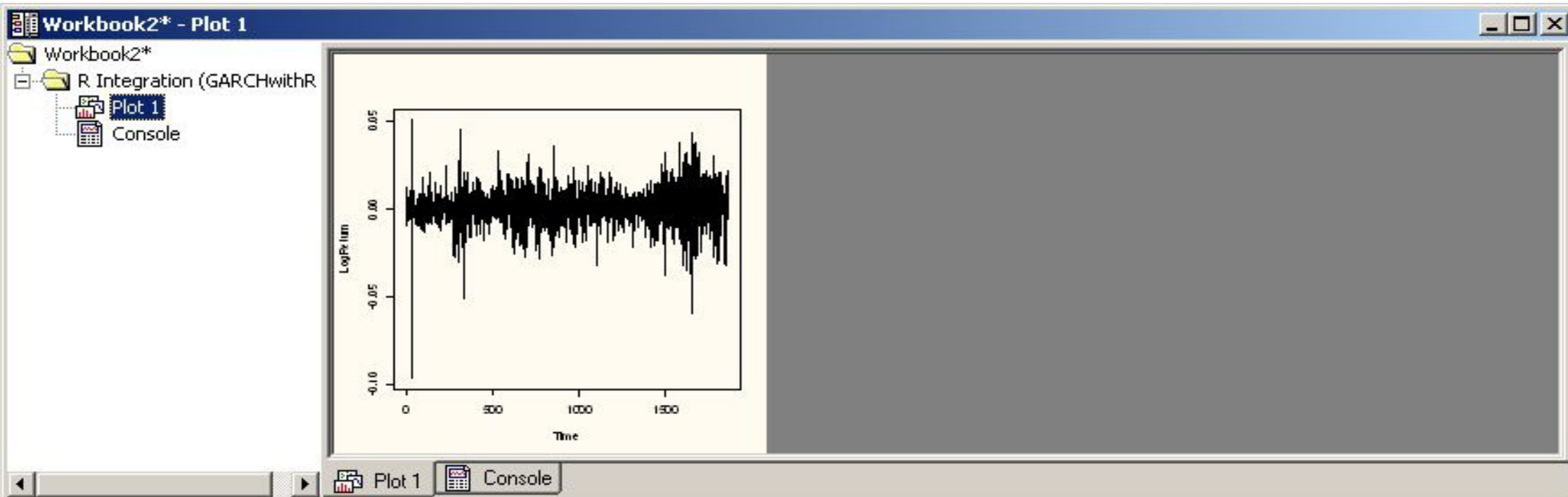
   RouteOutput(summary(daten.garch)[2:2][[1]],"Fitted Model",paste(model,"with AIC",AIC,"and BIC",
   RouteOutput(as.matrix(summary(daten.garch)[1:1][[1]]),"Estimated Residuals",paste("Estimated Re
   RouteOutput(summary(daten.garch)[5:5][[1]],"Jarque-Bera Test",paste("Jarque-Bera Test of",model
   RouteOutput(summary(daten.garch)[6:6][[1]],"Box-Ljung Test",paste("Box-Ljung Test of",model)) #
   RouteOutput(vcov(daten.garch),"Estimated Covariance Matrix",paste("Estimated Covariance Matrix

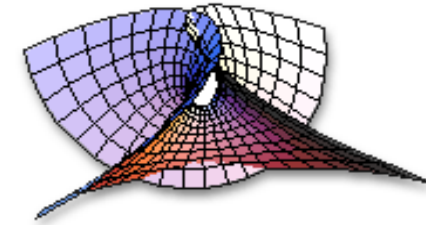
Leerlauf. 1
```

Output in workbook:

- ▶ A report (\approx RTF file) with console output.
- ▶ Graphs generated by `plot` as separate metafiles.





Extend these R scripts with the new commands offered by STATISTICA:

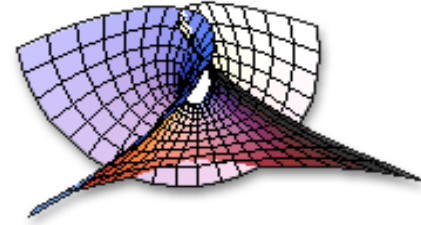
```
GARCHwithR.r
1  #' Designed for particular data file EuStockMarkets_LogReturns.sta (selects variable 6).
2
   library(tseries)

   p<-1
   q<-1
   varnr<-6
   n<-p+q+1
   model<-paste("Fitted GARCH(",p,".",q,") model",sep="")

   daten<-ActiveDataSet[varnr:varnr]
   plot.ts(daten, type="l")
   daten.nrow<-nrow(daten)
   daten.garch <- garch(daten, order = c(p,q))
   daten.garch.logLik<-logLik(daten.garch)
   AIC<-2*daten.garch.logLik + 2*n
   #AIC<-sapply(daten.garch, AIC)
   BIC<-2*daten.garch.logLik + log(daten.nrow-1)*n

   RouteOutput(summary(daten.garch)[2:2][[1]], "Fitted Model", paste(model, "with AIC", AIC, "and BIC",
   RouteOutput(as.matrix(summary(daten.garch)[1:1][[1]]), "Estimated Residuals", paste("Estimated Re
   RouteOutput(summary(daten.garch)[5:5][[1]], "Jarque-Bera Test", paste("Jarque-Bera Test of", model
   RouteOutput(summary(daten.garch)[6:6][[1]], "Box-Ljung Test", paste("Box-Ljung Test of", model)) #
   RouteOutput(vcov(daten.garch), "Estimated Covariance Matrix", paste("Estimated Covariance Matrix

Leerlauf. 1
```



Important new commands for R scripts:

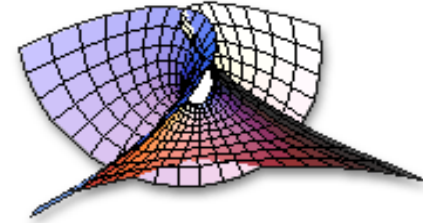
ActiveDataSet [*FromVar:ToVar*]

Spreadsheet ("*path*")

→ Access STATISTICA data file.

RouteOutput (**R table**, *name*, *header*)

→ Transfer R tables to STATISTICA tables,
display them separately in a workbook
(optional: with name "*name*", header "*header*").



Call R script from SVB macro:

```
GARCHwithR_2.svb
Objekt: [Allgemein]
Proz: Main

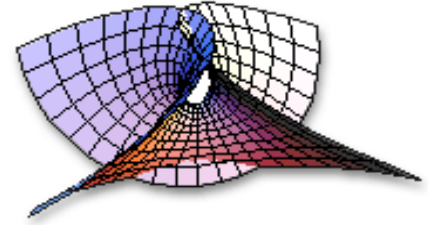
'Werte abfragen:
p=CLng(dlg.TextBox1a) 'Parameter p
q=CLng(dlg.TextBox1b) 'Parameter p

'Fehlerbehandlung bzgl. Eingabe:
If p<0 Then
    MsgBox "p is not a"+vbCrLf+"non-negative integer value!", _
        vbCritical+vbOkOnly, "Error"
    GoTo ende
End If

If q<0 Then
    MsgBox "q is not a"+vbCrLf+"non-negative integer value!", _
        vbCritical+vbOkOnly, "Error"
    GoTo ende
End If

Dim oColl As New Collection
oColl.Add(tabelle, "daten")
oColl.Add(VarListe(1), "varnr")
oColl.Add(p, "ppar")
oColl.Add(q, "qpar")

Dim oMacro As Macro
Set oMacro=Macros.Open("D:\Eigene Dateien\KategorialeZeitreihen\Vortraege\user! 2008\Vortrag\GARCH.r")
oMacro.ExecuteWithArgument(oColl)
```



```
Dim oMacro As Macro
```

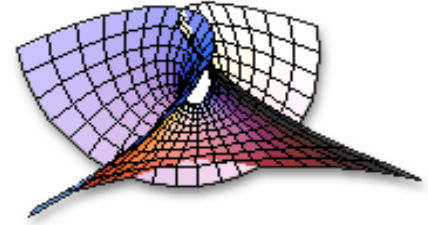
```
Set oMacro=Macros.Open ("path")
```

Run macro by one of following approaches:

```
oMacro.Execute
```

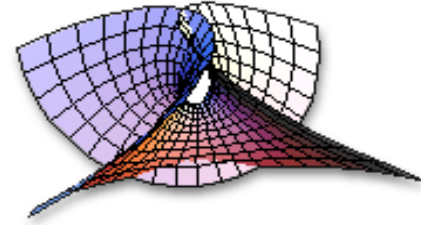
```
oMacro.ExecuteWithArgument (oColl)
```

```
oMacro.executeNoRouteOutput (oColl)
```



oMacro .Execute

Just execute R macro,
output controlled from R script, e.g., using command
RouteOutput.



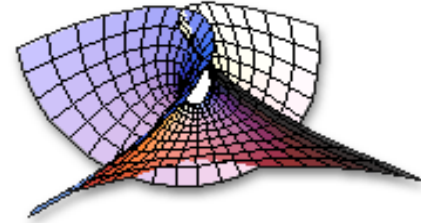
`oMacro.ExecuteWithArgument(oColl)`

Like before, but submit initial values through newly created **SVB Collection object**:

```
Dim oColl As New Collection
```

```
oColl.Add(STCAobj, "name")
```

“*name*” ist variable’s name in R.



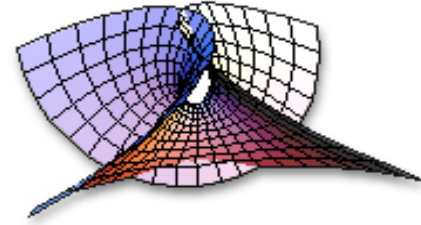
`oMacro.executeNoRouteOutput (oColl)`

Like before, but no immediate output to workbook.

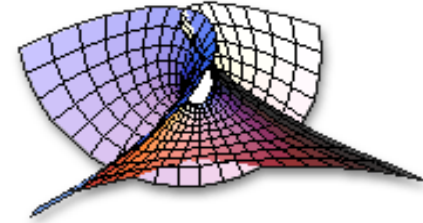
Instead:

Returns an object of newly created type
StaDocCollection.

Items of this object can be processed in SVB macro.



* References *



Baier, T., Neuwirth, E.: *R/Scilab (D)COM Server V 2.50*. March, 2007.

<http://cran.r-project.org/contrib/extra/dcom/>

Knoth, S.: *The spc Package (Statistical Process Control), Version 0.21*. October, 2007.

<http://cran.r-project.org/src/contrib/Descriptions/spc.html>

StatSoft: *STATISTICA Data Miner: Integrating R Programs into the Data Miner Environment*. StatSoft Business White Paper, June, 2003.

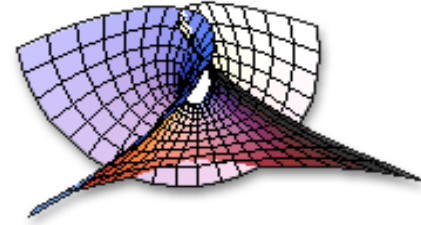
StatSoft: *Integration Options and Features to Leverage Specialized R Functionality in STATISTICA and WebSTATISTICA Solutions*. StatSoft White Paper, July, 2008.

Trapletti, A., Hornik, K.: *The tseries Package, Version 0.10-15*. May, 2008.

<http://cran.r-project.org/src/contrib/Descriptions/tseries.html>

Weiß, C.H.: *Datenanalyse und Modellierung mit STATISTICA*.

Oldenbourg Wissenschaftsverlag, München, 2006.



Thank You
for Your Interest!