e-learning/e-teaching of statistics: students' and teachers' views

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www.md-stat.com

www.e-stat.de

Internet services follow already certain standards:
shopping cart programs allow to book, shop and trade...

e-learning/e-teaching is just emerging and is far from such standards.

Statistics is the field that can profit a lot from e-learning/e-teaching standards.

Students' and teachers' views are essential for such a standardisation.

Statistics [stə'tistiks]

information extraction from complex structured data

skills: data handling, graphical insight, mathematics

Therefore students do not like statistics.

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Therefore students do not like statistics.

Effective education is a necessity.

student: e-learning is attractive!

teacher: e-learning is modern!

Both "e-s" have to be realized on one platform.

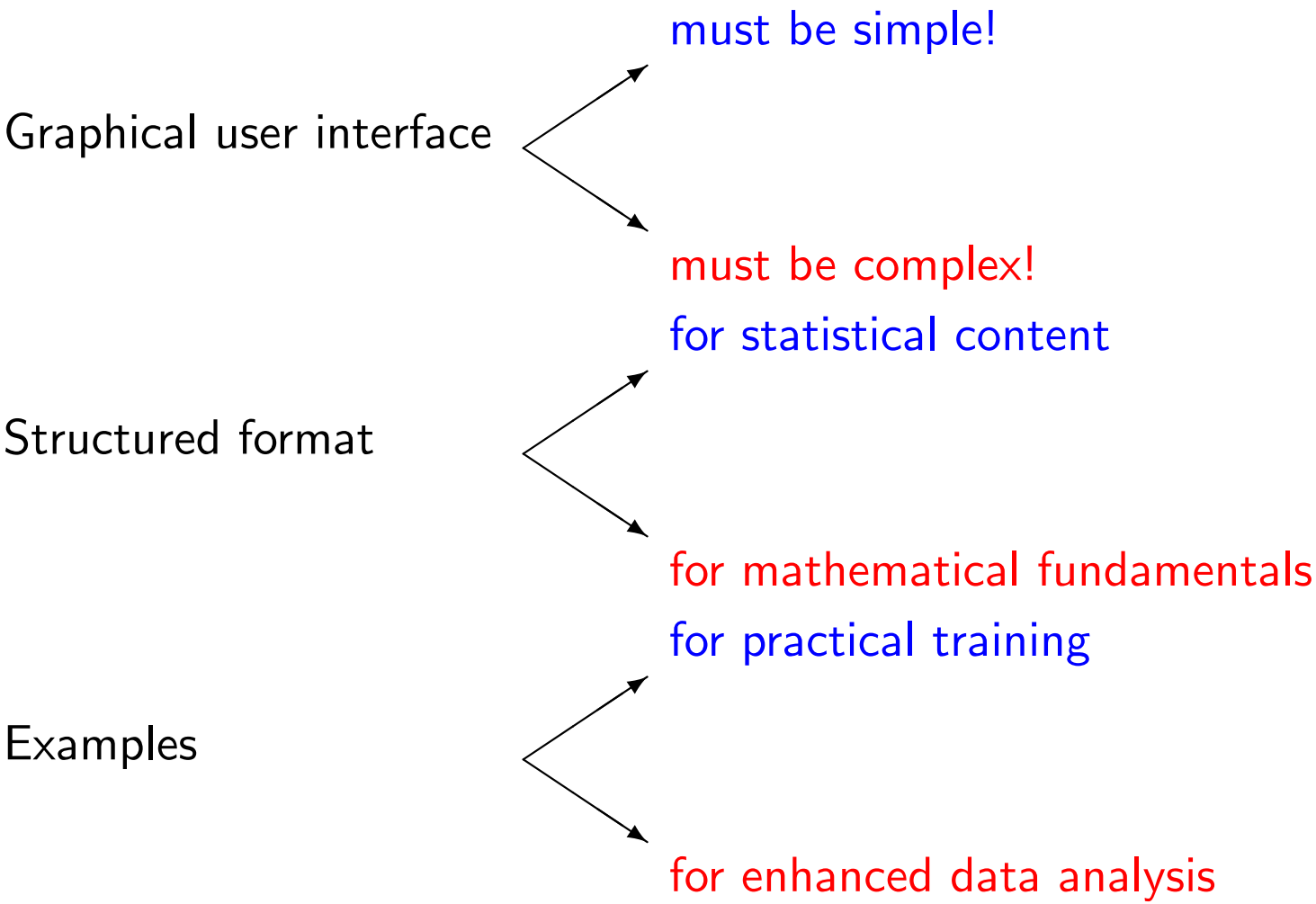
Therefore standardization is necessary.

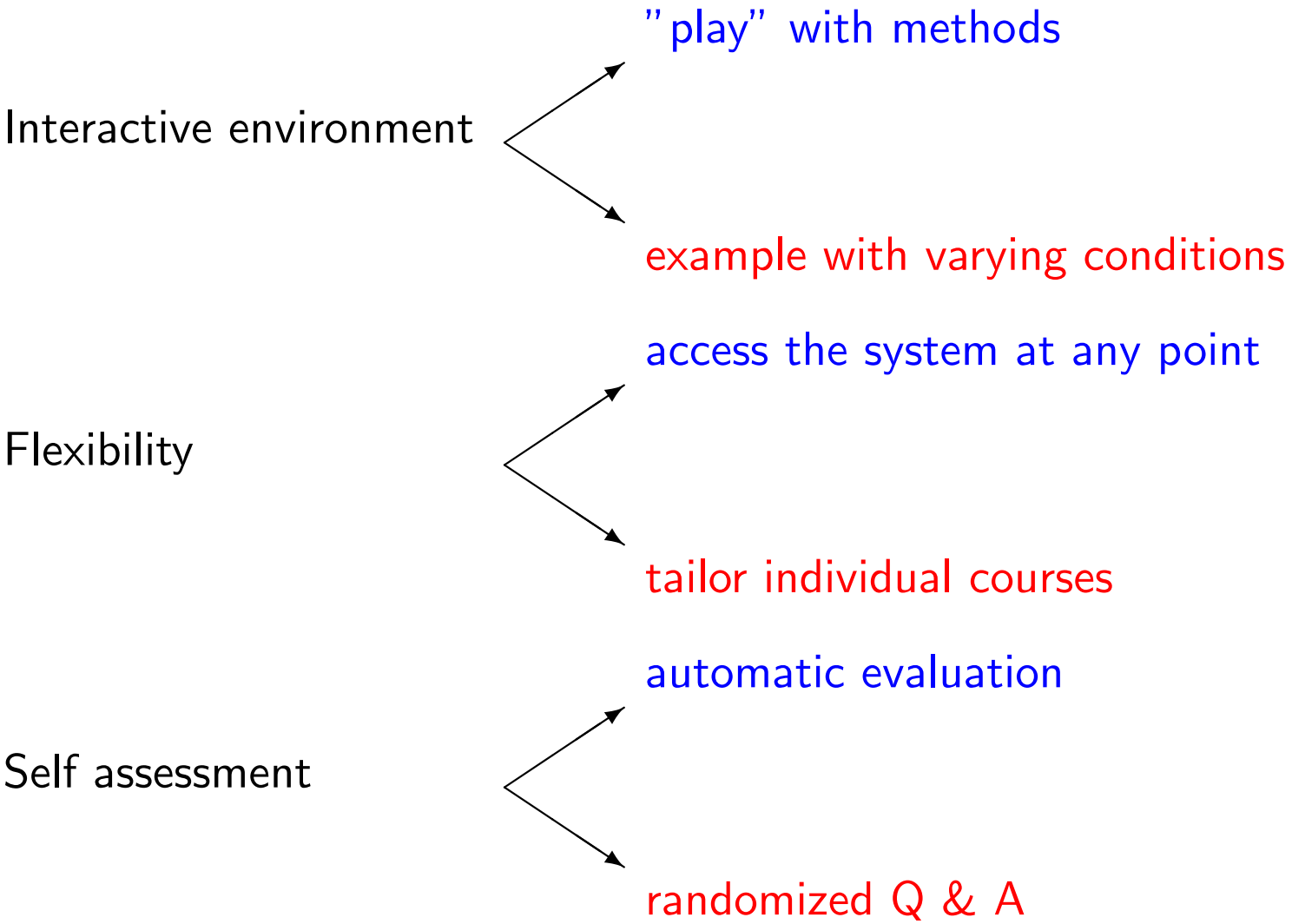
Proposals:

e-learning/e-teaching of statistics: students' and teachers' views

1. Introduction ✓
2. Teachers' and students' views
3. e-learning/e-teaching: MM*Stat
4. e-learning/e-teaching: e-stat
5. e-learning/e-teaching documents: MD*book
6. References

Teachers' and students' views




Interactive environment
"play" with methods
example with varying conditions
Flexibility
access the system at any point
tailor individual courses
Self assessment
automatic evaluation
randomized Q & A

Standardization issues

- Obtain code
- Copy and paste into the editor
- Run

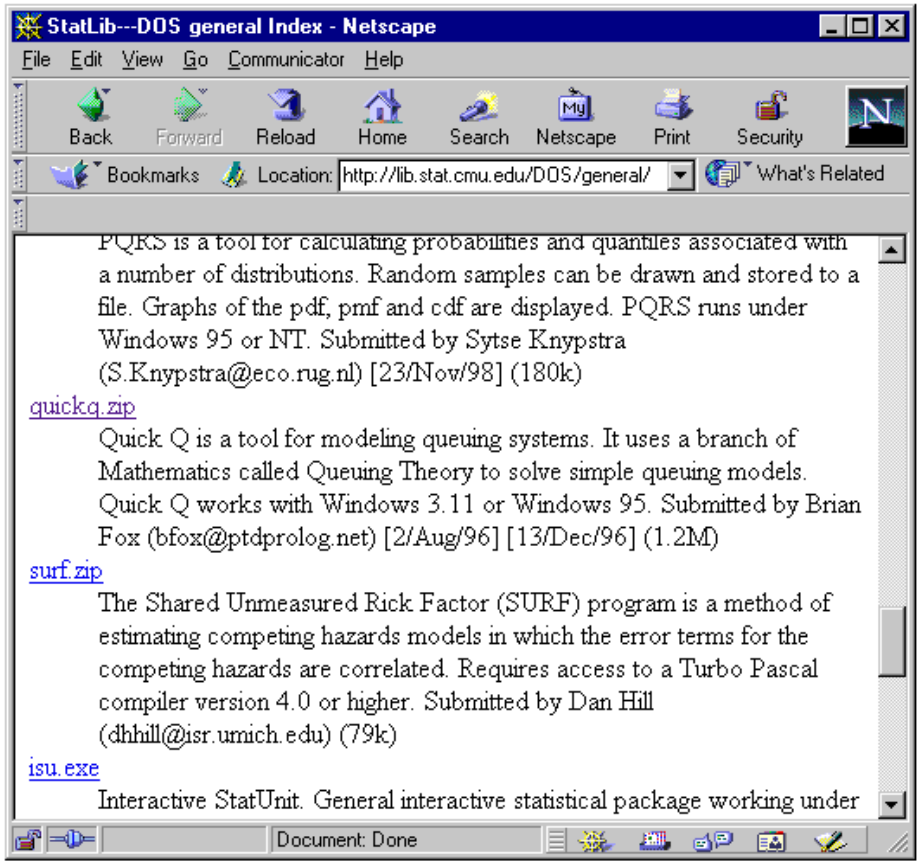
\+ Rich methodology

\+ Easy drop of methods

– No homogenous platform

– No guarantee

– Need proper software

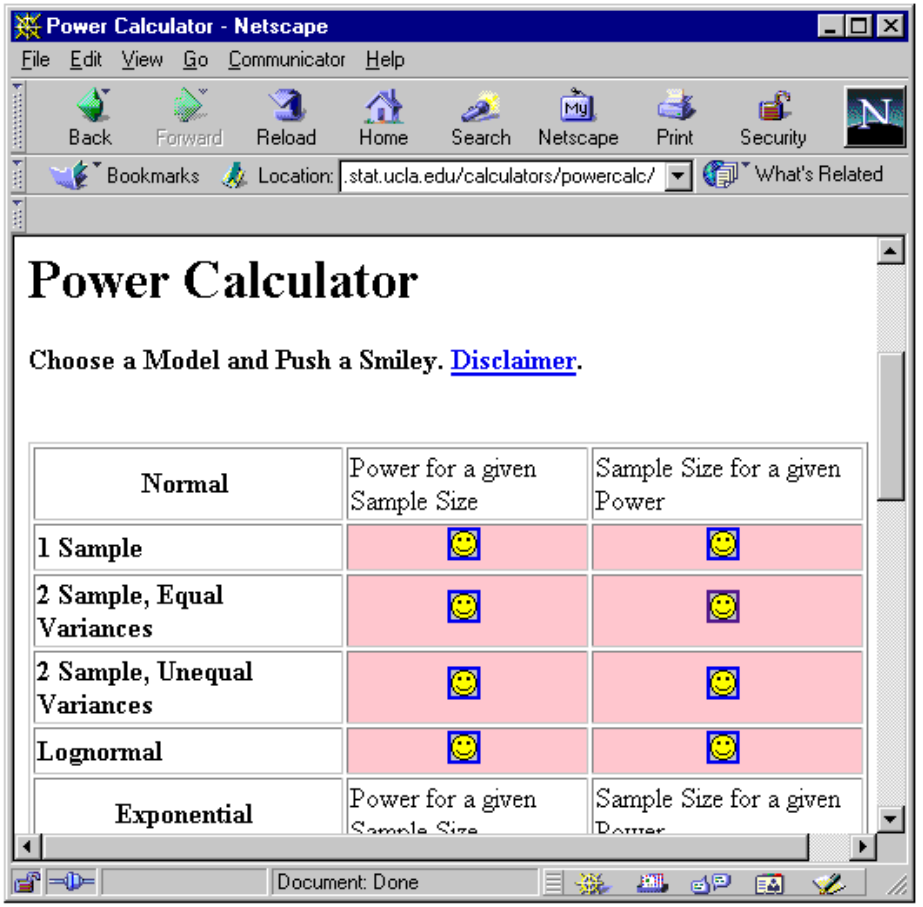


Standardization issues

- "Common Gateway Interface"
- Doesn't need Java
- Start through web server

+ Easy browsing
+ Fast access

– Only small data sets possible
– Limited methods selection
– Difficult to handle for authors



Standardization issues

- Applets
- Start through web browser

\+ Easy availability via browser

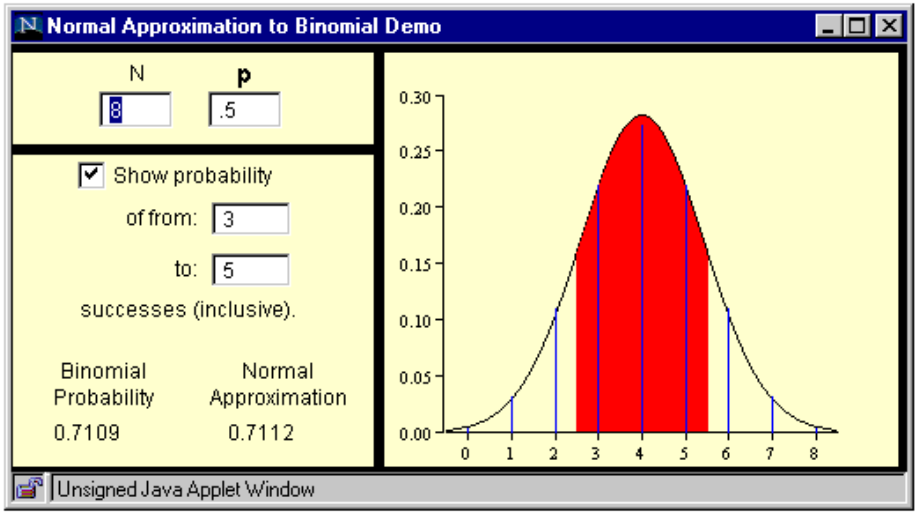
\+ Attractive for beginners

\+ Multiple platforms

– Code is prefixed

– Own data?

– Closed package



e-learning/e-teaching: MM*Stat

MM*Stat is an HTML based multimedia environment (www.md-stat.com).

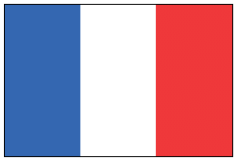
MM*Stat is an MD*booklet, created by MD*book.

MM*Stat is course-oriented:
It contains an introductory statistics course, usually taught at universities.

MM*Stat is available in many languages.

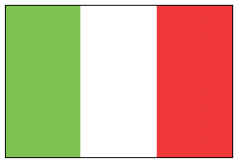
German

English

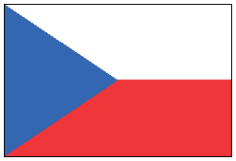


French

Spanish



Italian

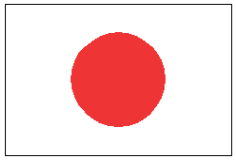


Czech

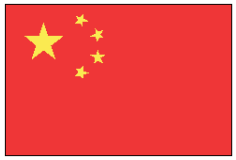
Polish

Indonesian

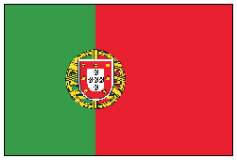
and soon in



Japanese



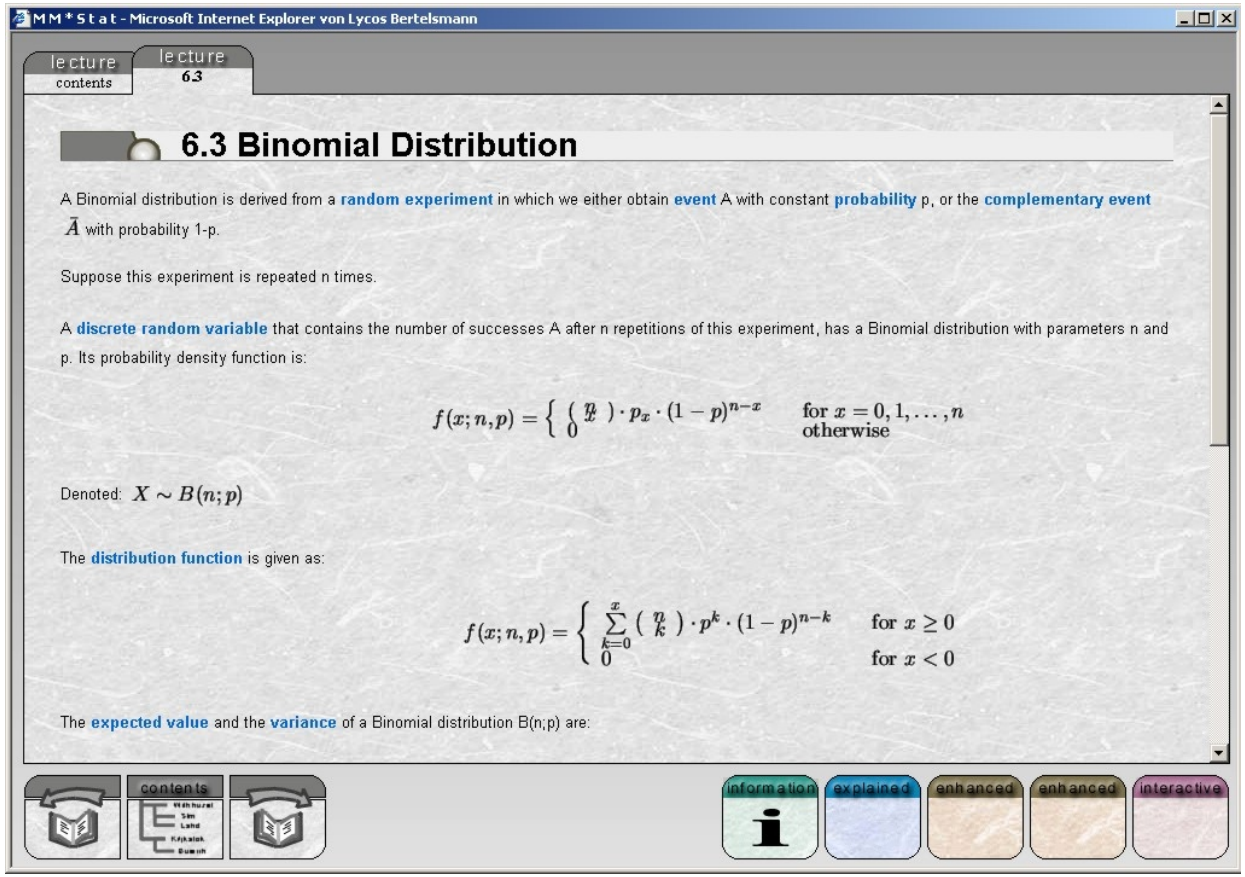
Chinese



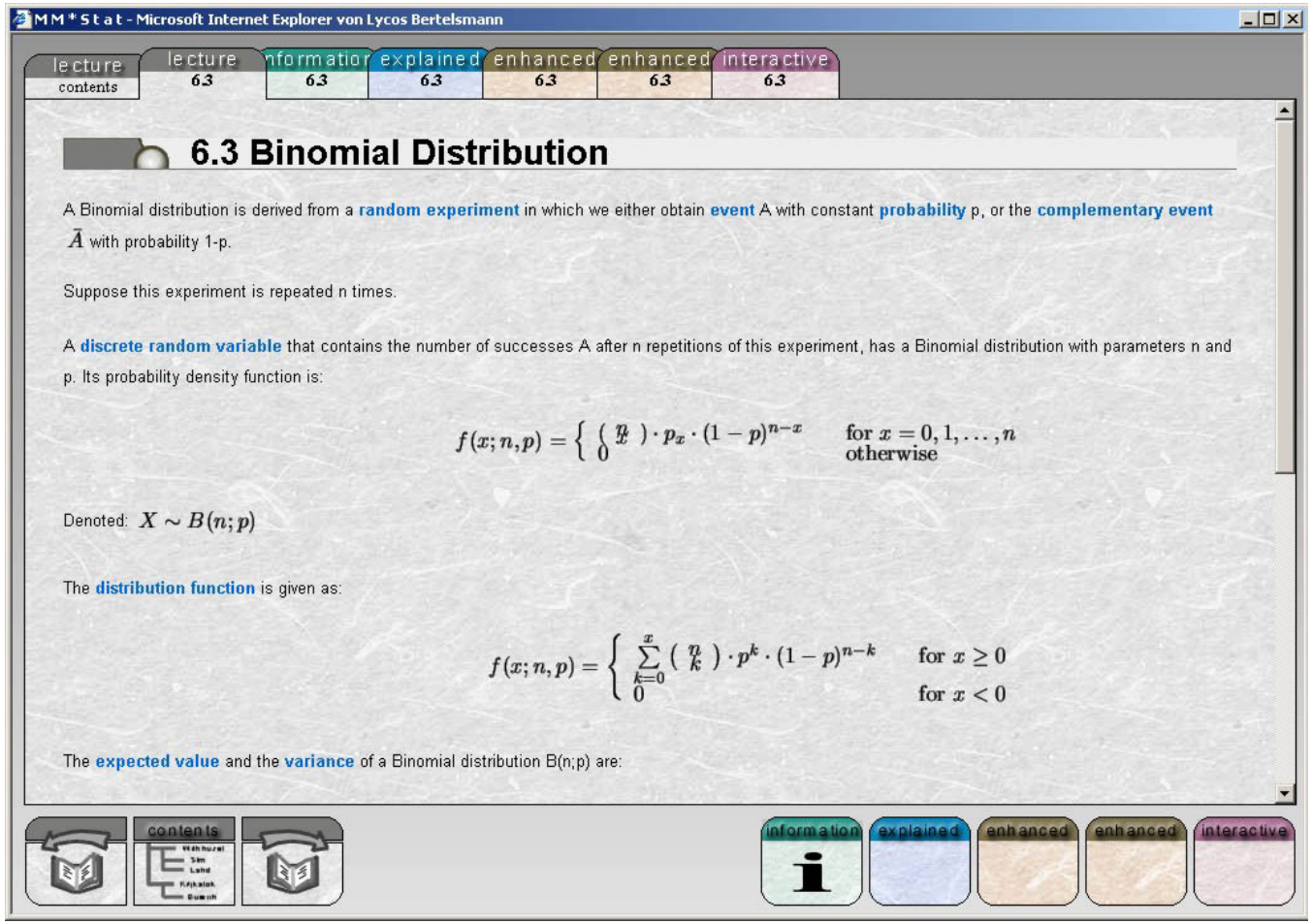
Portuguese

Dutch

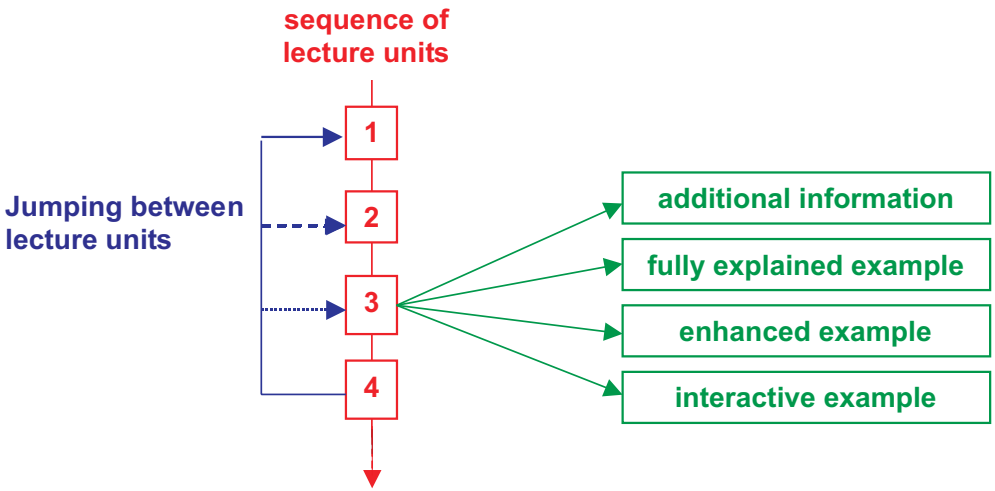
Graphical user interface of MM*Stat



Standardization is via an HTML filing card system.



Structured format:



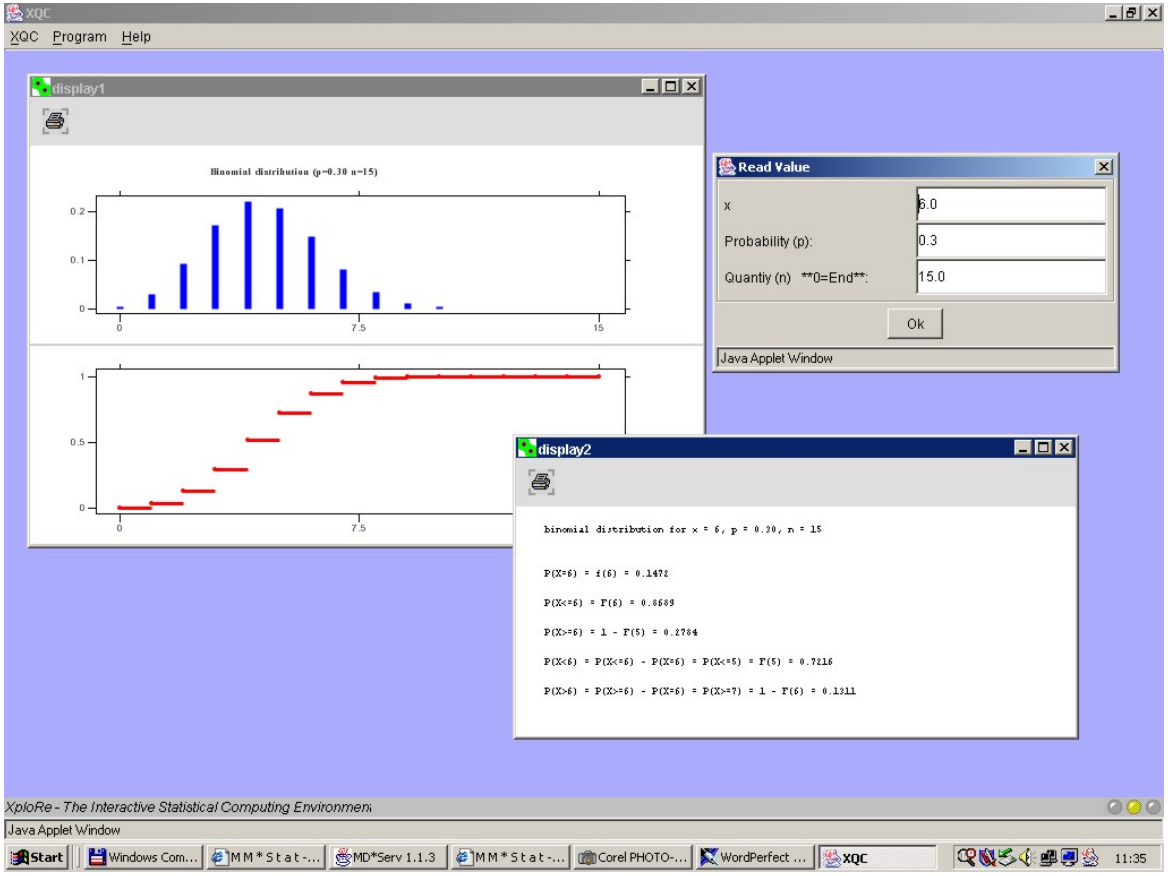
Sequence of lecture units:
straight ahead in statistical theory

Ramification by

- additional information
- examples
- self assessment
- hypertext functionality

Interactive environment

The implementation of interactive examples into MM*Stat is based on the XploRe Quantlet technology.



The graphical user interface of MM*Stat supports a structure which allows for

- standardization
- structured format
- flexibility
- interactive environment
- examples
- self assessment

Limitations of MM*Stat

- There is a specific course orientation.
- The example have an economics flavor.
- A specific statistical engine is addressed

Advantages of MM*Stat

+ usage in various courses of studies
+ automatic production from LateX via MD*book
+ MD*booklet format is very flexible with configuration of 300 parameters

e-learning/e-teaching: e-stat

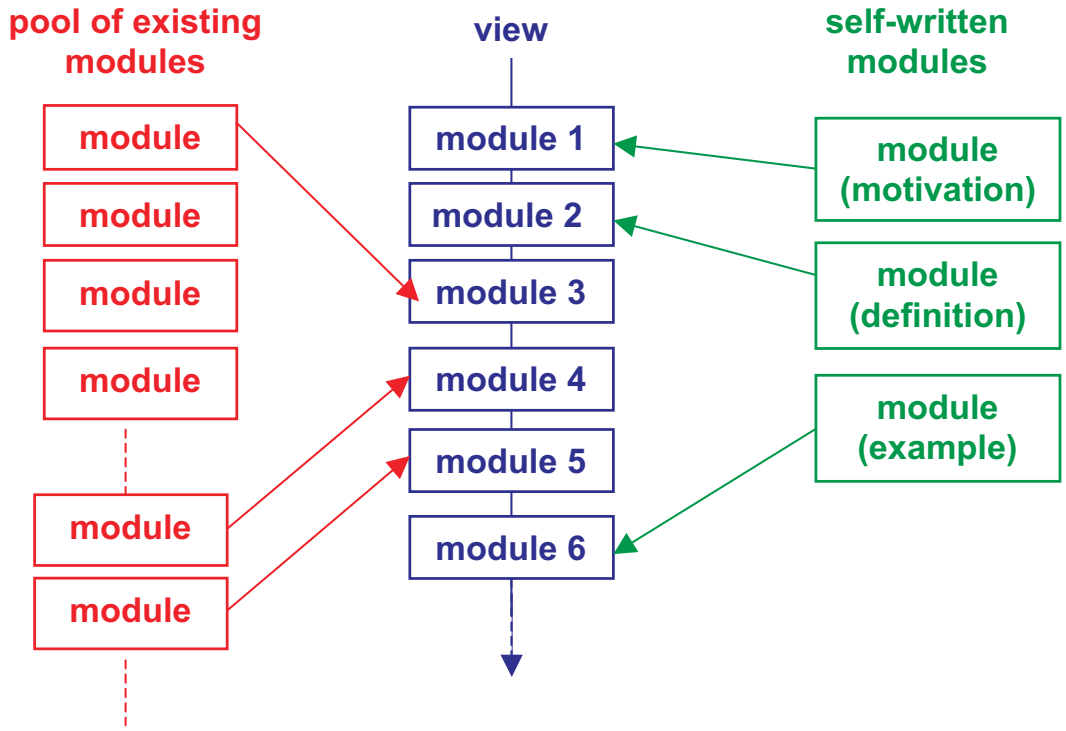
e-stat(www.e-stat.de) is currently under development by teams of 7 German universities.

e-stat is an open source system which is XML based. The statistical content is broken down into small modules.

Example: regression analysis

- module1: actual motivation
- module2: explanation of general purpose
- module3: specification of regression model
- module4: listing of properties
- module5: estimation techniques

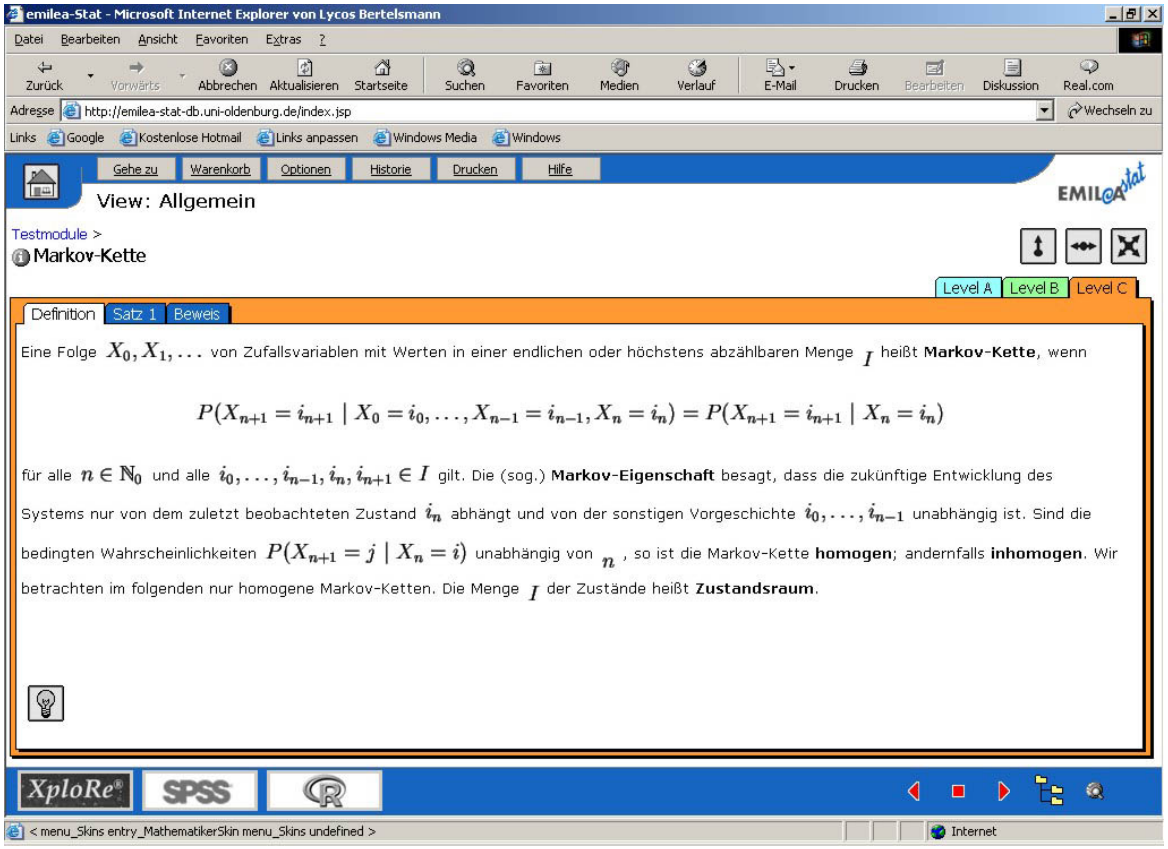
aim of the module concept: to compile statistics courses across topics and applications



e-stat view: application oriented arrangement of modules e.g. economics, biology, mathematics ···

e-stat scenarios: empirical applications with real-world data sets e.g. insurance, virtual enterprice ...

e-stat levels: A(low) B(medium) C(experienced)



self assessment

- online examples
- exercises
  - discrete or multiple choice
  - fill-in-the-blank text
  - free text answers

interactive environment

- applets
- R
- XploRe

e-learning/e-teaching: MD*book

MD*book
(www.md-book.com) web based document generation.

MD*book creates

- e-books 

- MD*booklets
  (MM*Stat, FIC, XIC, NIC, MIC)
- XML documents for e-stat
- PS format
- pdf format
- HTML format

Cooperation with Springer Verlag, Heidelberg

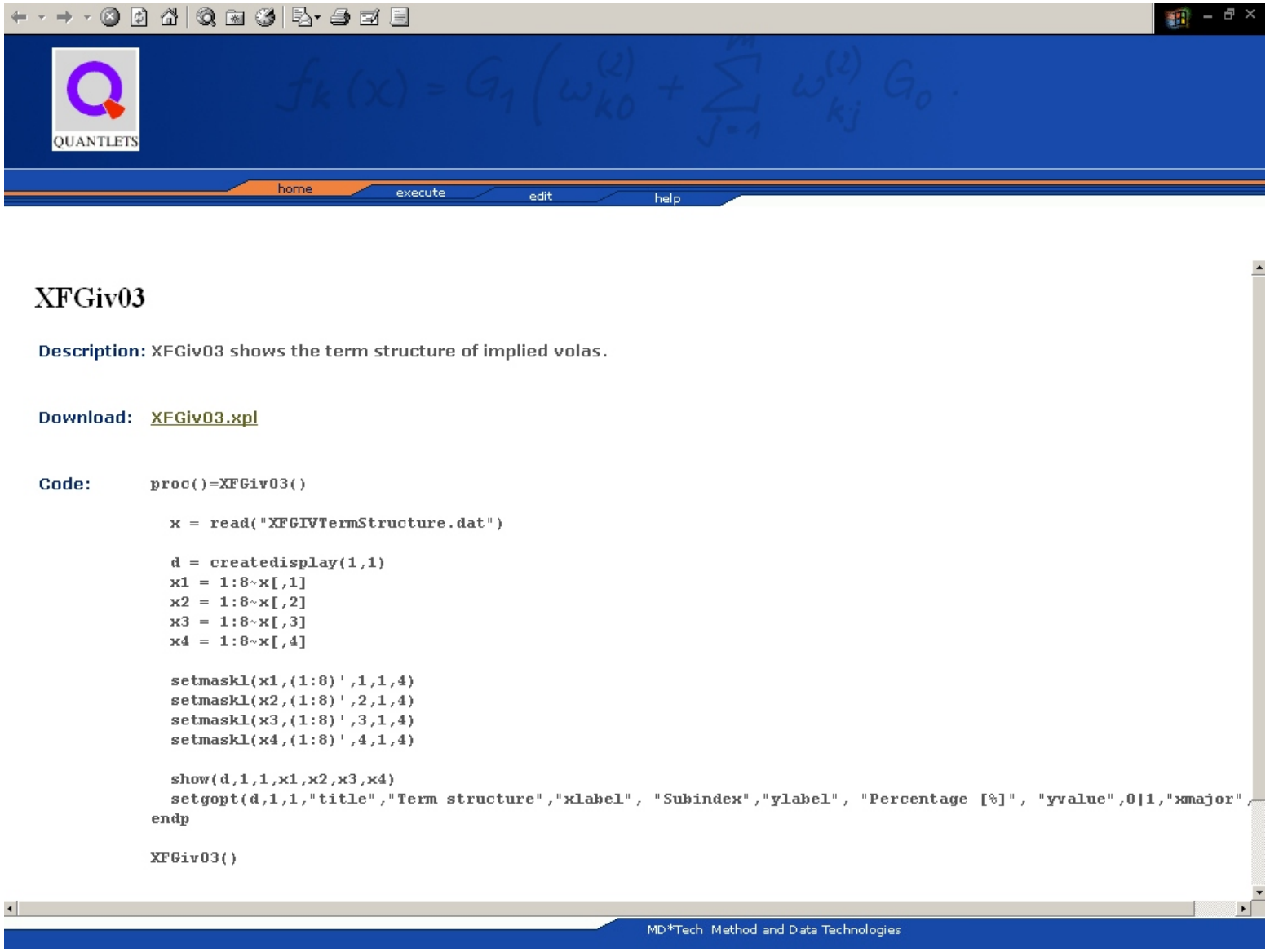
Applied Multivariate Statistical Analysis
W. Härdle, L. Simar

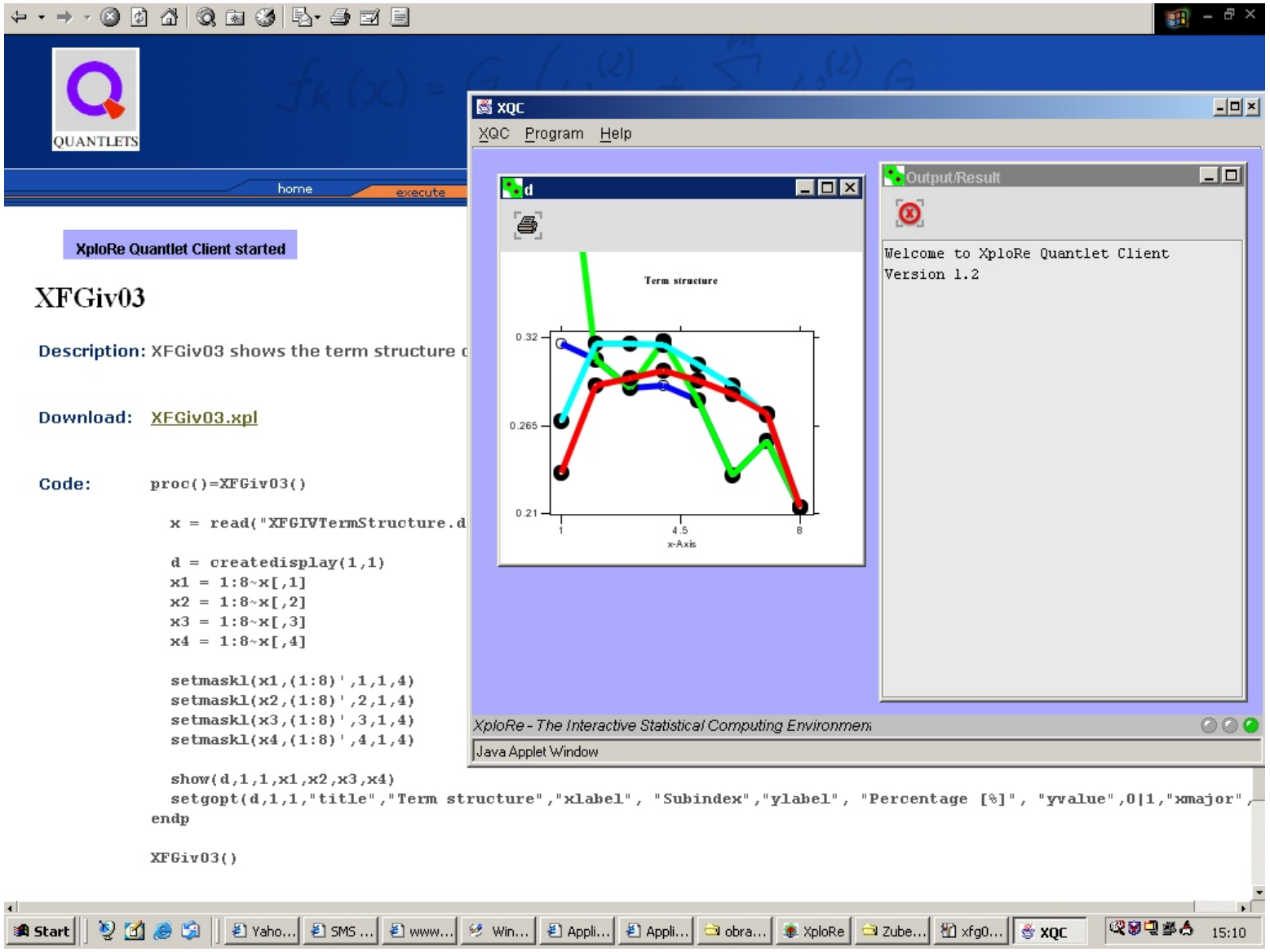
Applied Nonparametric Regression
W. Härdle

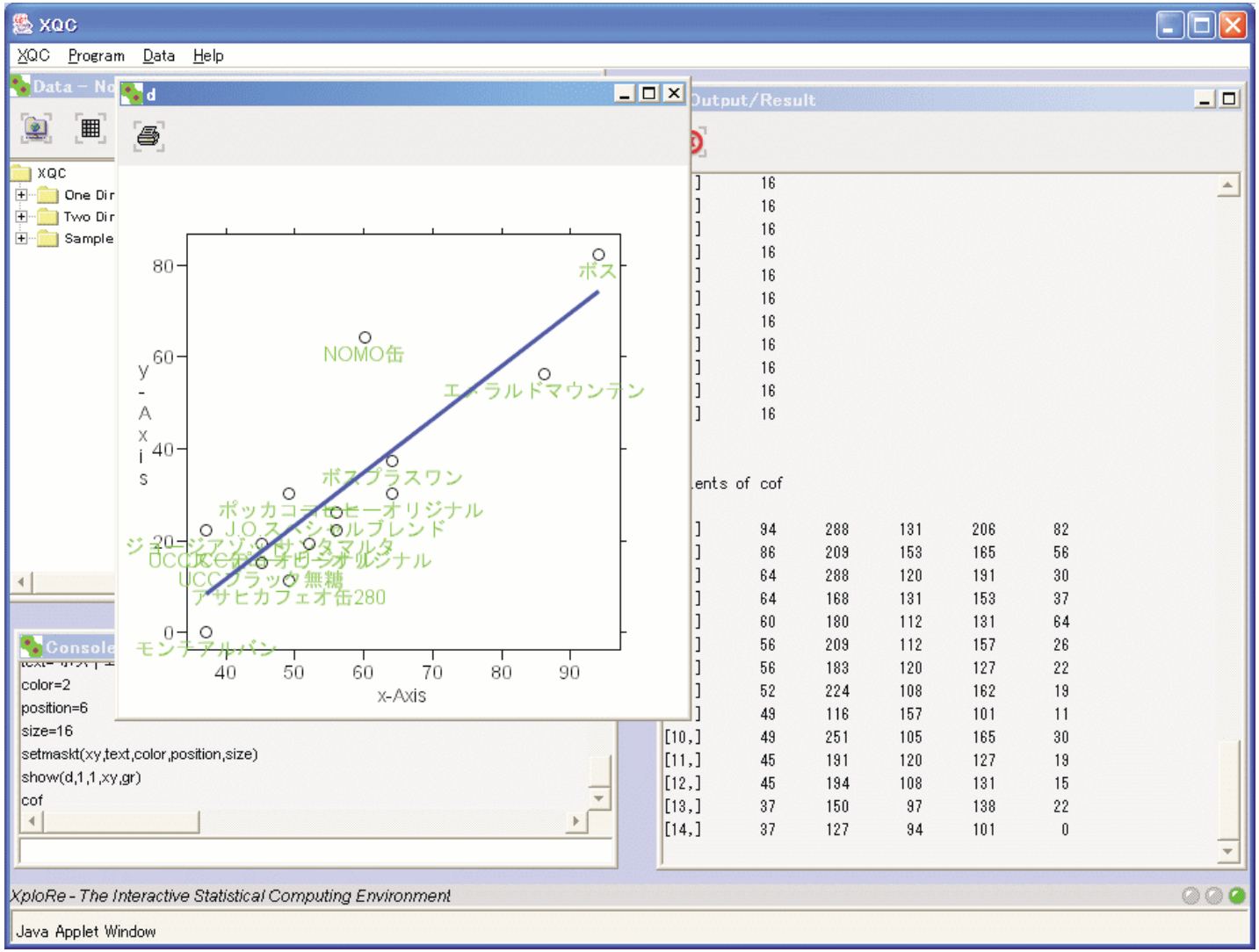
CAMBRIDGE UNIVERSITY PRESS

Applied Quantitative Finance
W. Härdle, T. Kleinow, G. Stahl

COMPSTAT 2002–Proceedings in Computational Statistics
W. Härdle, B. Rönz


QUANTLETS
home
execute
edit
help
XFGiv03
Description: XFGiv03 shows the term structure of implied volas.
Download: XFGiv03.xpl
Code:
proc()=XFGiv03()
x = read("XFGIVTermStructure.dat")
d = createdisplay(1,1)
x1 = 1:8~x[,1]
x2 = 1:8~x[,2]
x3 = 1:8~x[,3]
x4 = 1:8~x[,4]
setmaskl(x1,(1:8)',1,1,4)
setmaskl(x2,(1:8)',2,1,4)
setmaskl(x3,(1:8)',3,1,4)
setmaskl(x4,(1:8)',4,1,4)
show(d,1,1,x1,x2,x3,x4)
setgopt(d,1,1,"title","Term structure","xlabel", "Subindex","ylabel", "Percentage [%]", "yvalue",0|1,"xmajor",
endp
XFGiv03()
MD*Tech Method and Data Technologies


QUANTLETS
home
execute
XploRe Quantlet Client started
XFGiv03
Description: XFGiv03 shows the term structure
Download: XFGiv03.xpl
Code:
proc()=XFGiv03()
x = read("XFGIVTermStructure.d
d = createdisplay(1,1)
x1 = 1:8~x[,1]
x2 = 1:8~x[,2]
x3 = 1:8~x[,3]
x4 = 1:8~x[,4]
setmask1(x1,(1:8)',1,1,4)
setmask1(x2,(1:8)',2,1,4)
setmask1(x3,(1:8)',3,1,4)
setmask1(x4,(1:8)',4,1,4)
show(d,1,1,x1,x2,x3,x4)
setgopt(d,1,1,"title","Term structure","xlabel", "Subindex","ylabel", "Percentage [%]", "yvalue",0|1,"xmajor",
endp
XFGiv03()
XQC
XQC Program Help
d
Term structure
0.32
0.265
0.21
1
4.5
8
x-Axis
Output/Result
Welcome to XploRe Quantlet Client
Version 1.2
XploRe - The Interactive Statistical Computing Environment
Java Applet Window
Start
Yaho...
SMS ...
www...
Win...
Appli...
Appli...
obra...
XploRe
Zube...
xfg0...
XQC
15:10


XQC
XQC Program Data Help
Data – Nc
XQC
One Dir
Two Dir
Sample
d
y-Axis
x-Axis
ボス
NOMO缶
エメラルドマウンテン
ボスプラスワン
ポッカコーヒーオリジナル
J.O.スペシャルブレンド
ジョージアゾーサタマルタ
UCCブラック無糖
アサヒカフェオ缶280
モンテアルバン
Output/Result
ents of cof
Console
color=2
position=6
size=16
setmaskt(xy,text,color,position,size)
show(d,1,1,xy,gr)
cof
XploRe - The Interactive Statistical Computing Environment
Java Applet Window

e-learning/e-teaching

are the basis for

e-learning/e-teaching

are the basis for

e-science

e-learning/e-teaching

are the basis for

e-science

and

e-business

References

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Cramer, E., Cramer, K. & Kamps, U. (2002). e-stat: A Web-based Learning Environment in Applied Statistics. *Härdle, W., Rönz, B., Compstat 2002, Proceedings in Computational Statistics*, Physica-Verlag, Heidelberg, New York, 309–314.

Witzel, R.& Klinke, S. (2002). MD*Book online & e-stat: Generating e-stat Modules from Latex.*Härdle, W., Rönz, B., Compstat 2002, Proceedings in Computational Statistics*, Physica-Verlag, Heidelberg, New York, 449–454.