# Web-based Interactive Teaching of Nonparametric Models

Marlene MÜLLER


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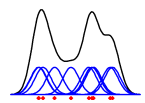
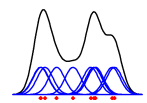
Institut für Statistik und Ökonometrie
Wirtschaftswissenschaftliche Fakultät
Humboldt–Universität zu Berlin, Germany

http://ise.wiwi.hu-berlin.de/∼marlene



# Outline

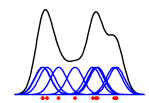
- Introduction
  - Introductory statistics
  - Advanced statistics courses
- WWW Interfaces to Stat/Math Software
- XploRe – XQC – XQS
- Teaching material on the Web
- Interactive Possibilities in XQC/XQS



# Introduction

Profiles for computer–assisted teaching

- **Introductory courses**
  Students learn the basic elements and methods
- **Advanced courses**
  Students deal with particular statistical problems.



# Introductory Statistics Courses

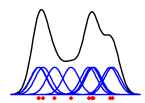
- only a few computer-based examples
- computer–assisted teaching is meant to complement the course (300 students per year!)

$\Rightarrow$ computer programs are presented by the teacher/ are used by the students outside the classroom

$\Rightarrow$ main object is to study properties of statistical objects (e.g. variables, distributions) and methods (e.g. linear regression)

$\Rightarrow$ material should be easily accessible (WWW), mostly hardware independent, and easy to use

Statistics I, II $\rightarrow$ MM*stat (www.mm-stat.de)



# Advanced Statistics Courses

- software is directly used by students
- course scripts in electronic form are available

$\Rightarrow$ students apply "serious" statistical methods to real world examples

$\Rightarrow$ students get an introduction into programming the methods themselves

Applied Multivariate Statistical Analysis

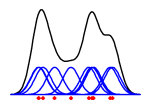
$\longrightarrow$ ise.wiwi.hu-berlin.de/statistik/multi.html

Non- and Semiparametric Modelling

$\longrightarrow$ ise.wiwi.hu-berlin.de/statistik/npm.html, ise.wiwi.hu-berlin.de/statistik/spm.html

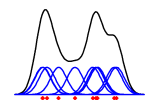
Statistics of Financial Markets

$\longrightarrow$ ise.wiwi.hu-berlin.de/statistik/fin_ma.html



# General Software Requirements

- for introductory courses, routines should be mostly self–explaining,
- for advanced courses, several levels of complexity should be possible: from simple and easy–to–modify macros to full–featured applications,
- easy to access software,
- network capabilities, in particular WWW integration.

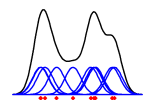


# Specific Software Requirements

- state–of–the–art statistical methods,
- graphics: 2D and 3D,
- user interaction
- (high level) programming language.

...

- easy to learn/program,
- computational speed.



# WWW Interfaces to Stat/Math Software

- **Rweb**

  http://www.math.montana.edu/Rweb

- **StatServer** (S–Plus)

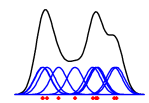
  http://www.mathsoft.com/statserver

- **XploRe (Java version)**

  http://www.xplore-stat.de/java/java.html

- **MathXplorer/JS** (MathViews)

  http://www.mathwizards.com/products/MathXplorerJ



# Statistics over the WWW

- **WebStat**

  http://www.stat.sc.edu/webstat/

- **Xlisp-Stat**

  http://www.stat.ucla.edu/~jose/Xlisp-Stat.cgi

- **XploRe**

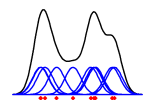
  http://www.xplore-stat.de/java/java.html

- **Statlets**

  http://www.sgcorp.com/statlets.htm

- **GASP** Globally Accessible Statistical Procedures

  http://www.stat.sc.edu/rsrch/gasp/



# Web Enhanced Courses

- **Overview**

  http://www.execpc.com/~helberg/statistics.html

- **GAUSS Programming for Econometricians**

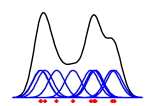
  http://eclab.econ.pdx.edu/gpe

and ...

- **Non- and Semiparametric Modelling** (XploRe)

  http://ise.wiwi.hu-berlin.de/statistik/npm.html

  http://ise.wiwi.hu-berlin.de/statistik/spm.html



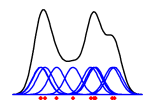
# XploRe

http://www.xplore-stat.de

- interactive computational environment for statistics
- can be used either as standalone version as well as within a local network or the Internet

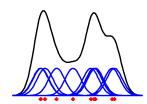
Schmelzer, Kötter, Klinke & Härdle (CompStat'96 Proceedings),

Härdle, Klinke, Müller: XploRe Learning Guide (Springer 1999)



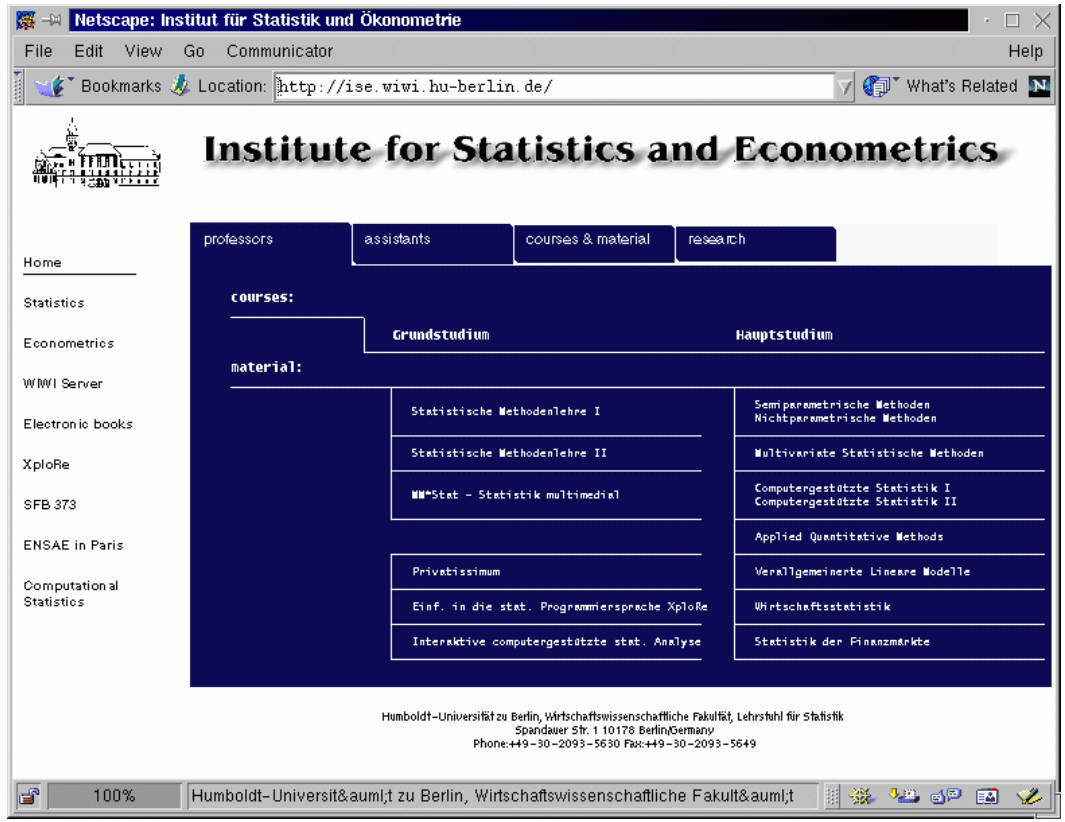
# XploRe Flavours

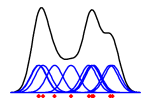
- ⋆ generic (standalone) versions
  for Unix/X11 (Solaris/Sparc, Linux/PC, ...) and for MS Windows (95/98/NT/2000 for PC)
- ⋆ Java client/server version – XQC/XQS
  The server might run on a remote machine. The XploRe Java client runs under Java 1.1.
- ⋆ Java applet version at the XploRe Web site – XQC
  http://www.xplore-stat.de/java/java.html



# Teaching Material on the Web

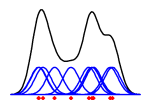
- http://ise.wiwi.hu-berlin.de
  → Statistics → courses & material



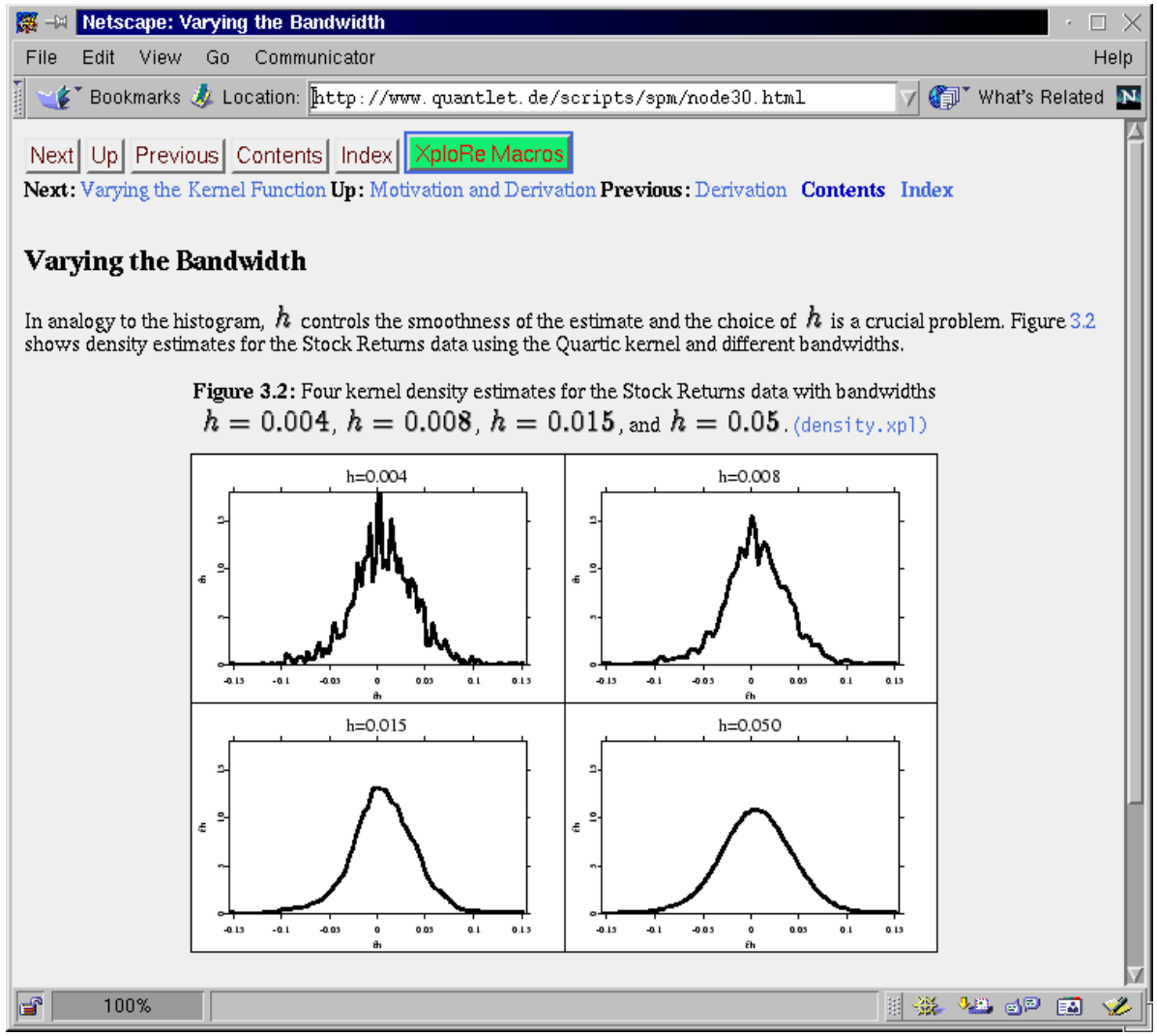



# XploRe Based Teaching Material on the Web

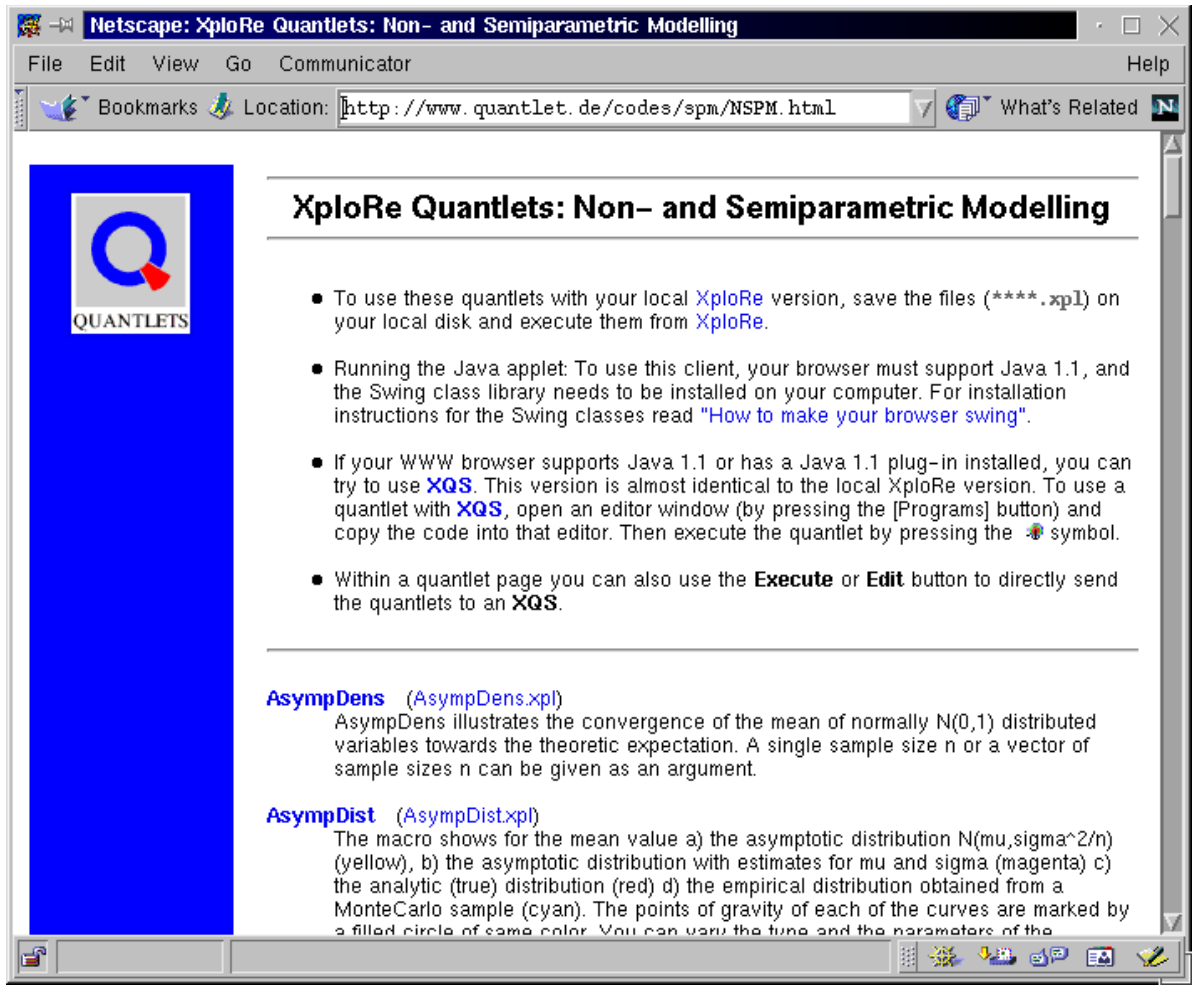
- http://www.xplore-stat.de/ebooks/ebooks.html

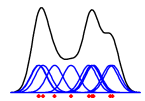



# Electronic Scripts with Hyperlinks

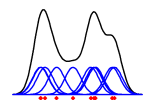


# XploRe Quantlets

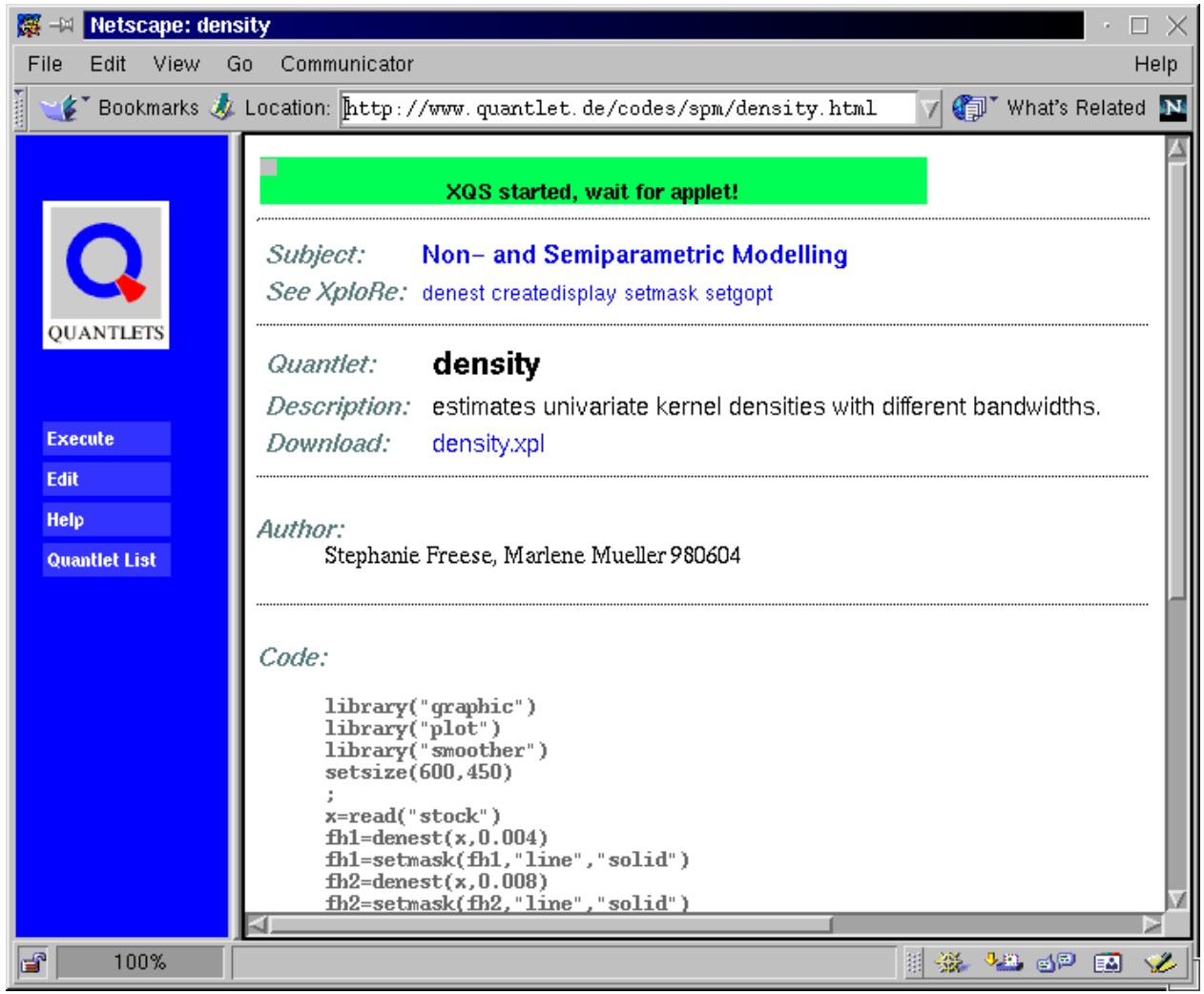


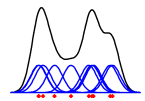



```
; ------------------------------------------------------
; Library        NSPM
; ------------------------------------------------------
;  See_also      denest createdisplay setmask setgopt
; ------------------------------------------------------
;   Macro        density
; ------------------------------------------------------
;   Description  estimates univariate kernel densities
;                with different bandwidths.
; ------------------------------------------------------
;   Author       Stephanie Freese, Marlene Mueller 980604
; ------------------------------------------------------
library("plot")
library("smoother")
;
x=read("stock")
fh1=denest(x,0.004)
fh1=setmask(fh1,"line","solid")
```

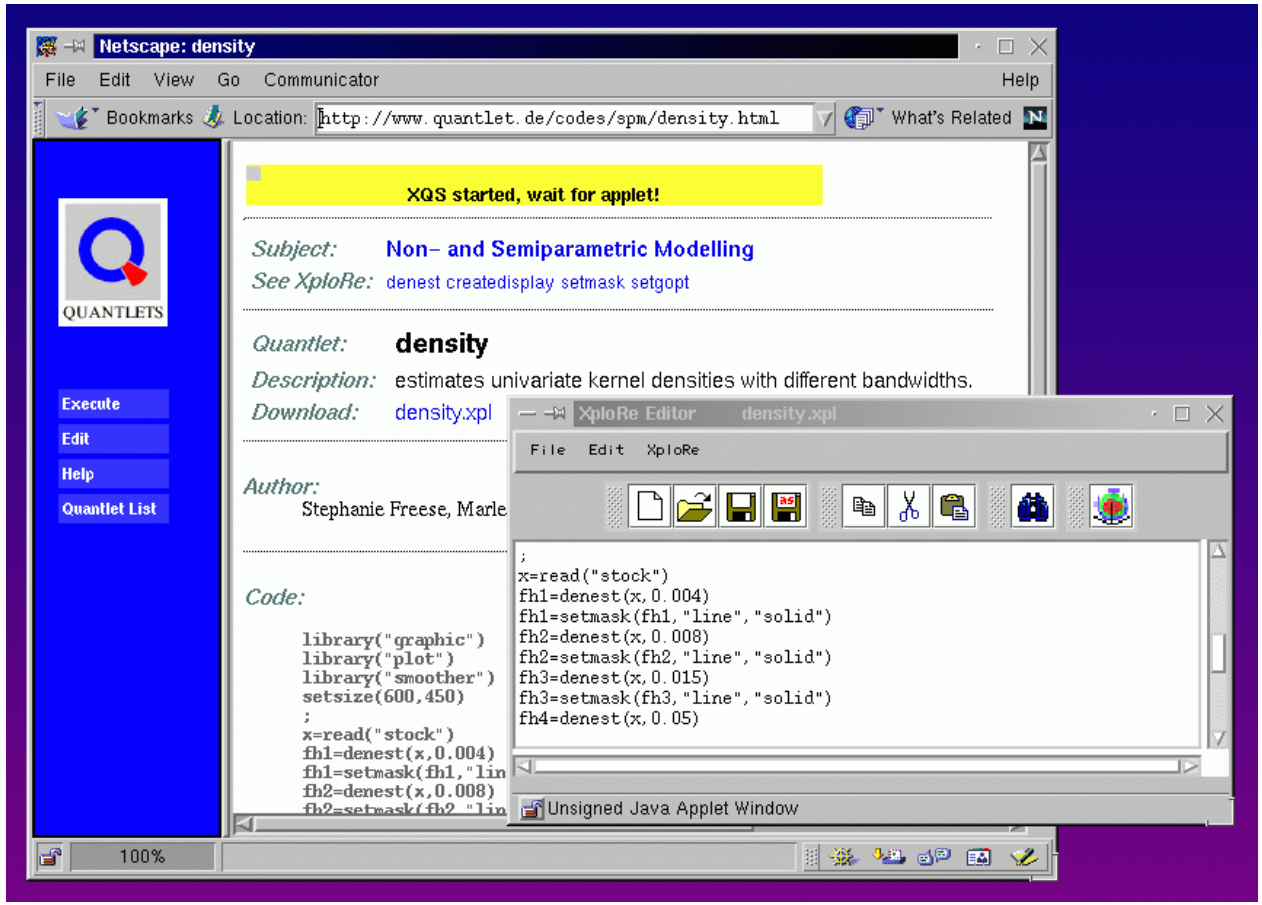


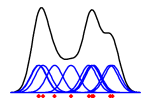
# Executable Quantlet



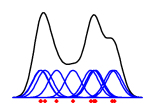
# Editable Quantlet



# Examples from Non- and Semiparametric Modelling

- ⋆ interactive examples
- ⋆ user-programmable examples



## Interactive Examples

XploRe tools

- `readvalue`:
  A input box to enter and modify parameters.
- `selectitem`:
  A selection box to choose from a number of options.

## User-Programmable Examples

XploRe tool

- XQC editor