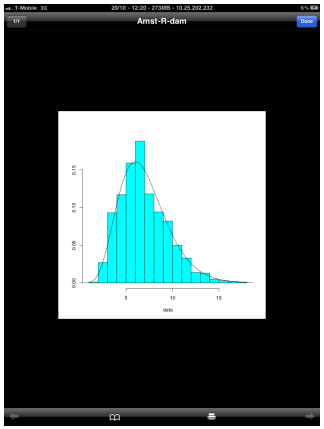
R fun in Amst-R-dam

Richard Gill
http://www.math.leidenuniv.nl/~gill

September 2011

1: Reverse-engineering the VVS logo

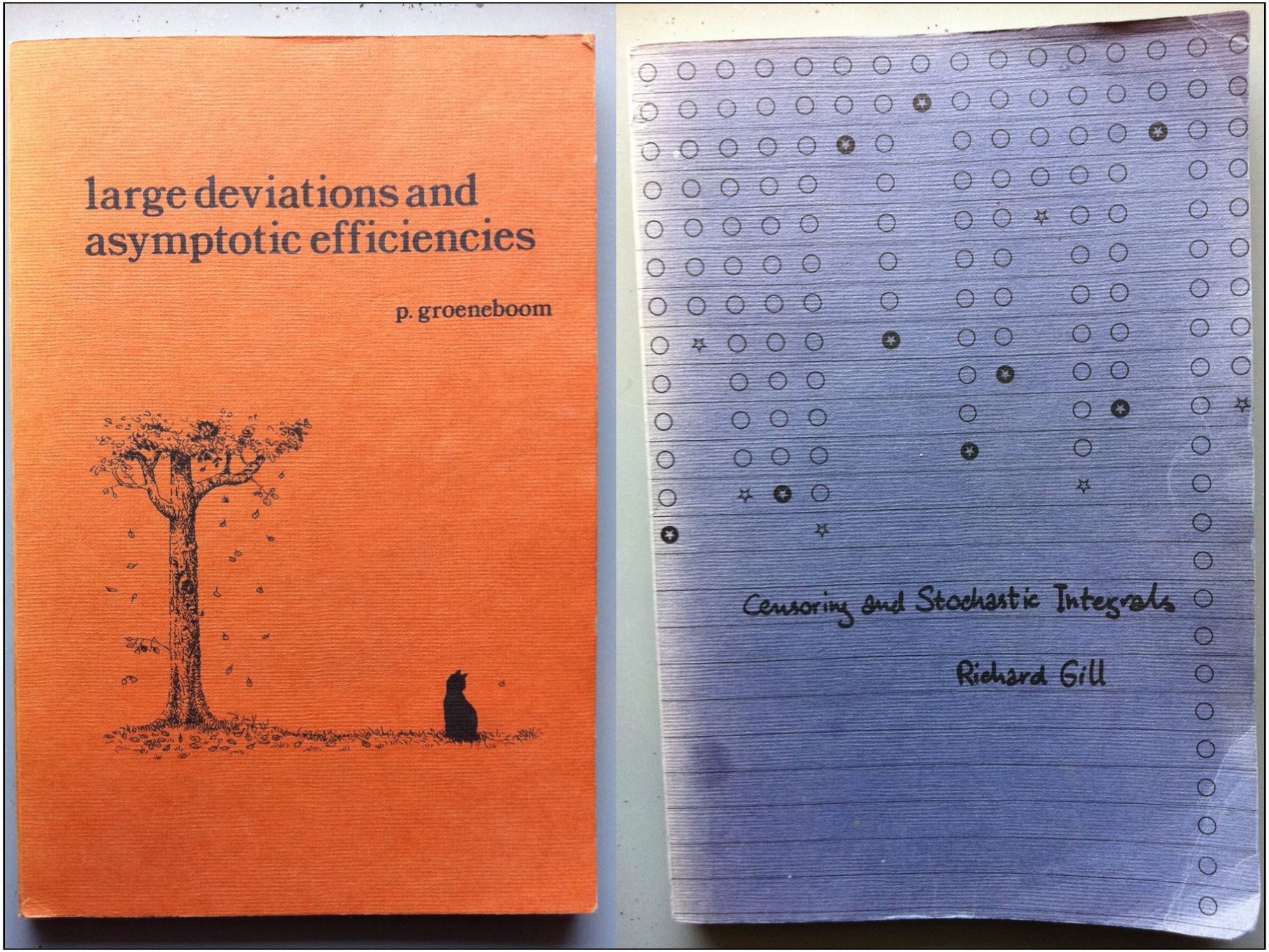
2: R on iPhone or iPad



Updates: 27 January 2012, 3 July 2012
(see end of each section)

Part 1: The VVS logo

Original art-work: **Tobias Baanders,** ca. 1970 (pen and ink)
Current version: scanned image converted to postscript, 1996


large deviations and
asymptotic efficiencies
p. groeneboom
Censoring and Stochastic Integrals
Richard Gill

statistica
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Statistics, Biometrics,
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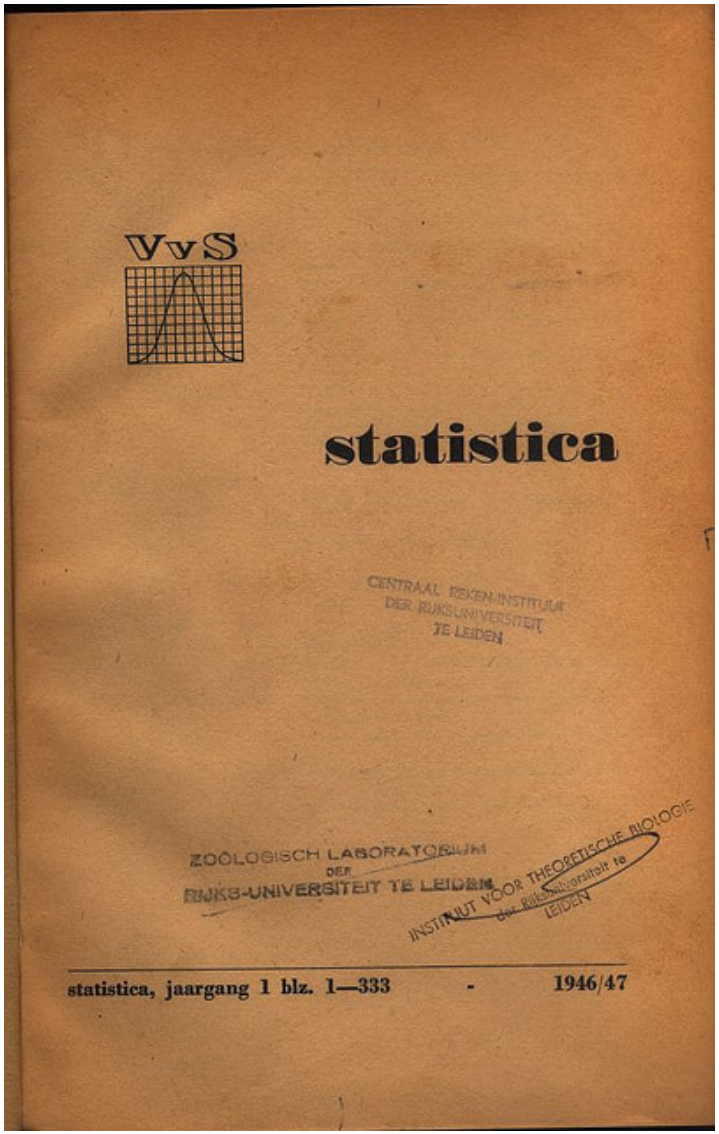
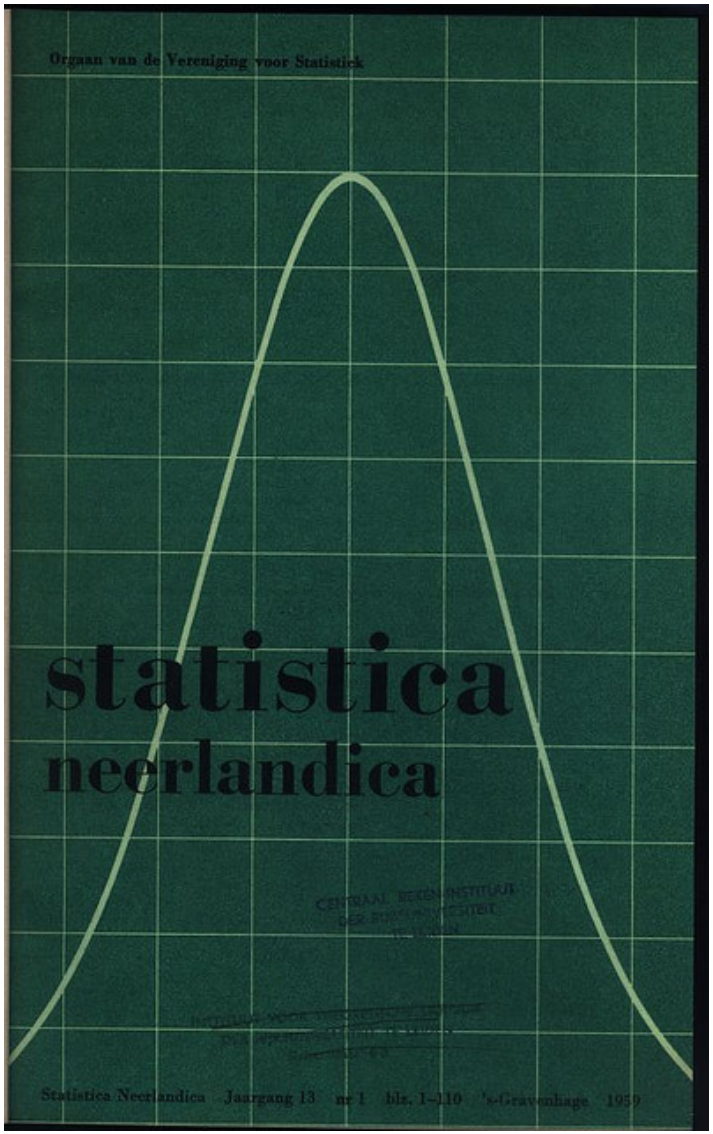
1971


VvS
statistica
CENTRAAL REKEN-INSTITUUT
DER RIJKSUNIVERSITEIT
TE LEIDEN
ZOOLOGISCH LABORATORIUM
DER
RIJKS-UNIVERSITEIT TE LEIDEN
INSTITUUT VOOR THEORETISCHE BIOLOGIE
der Rijksuniversiteit te
LEIDEN
statistica, jaargang 1 blz. 1—333 - 1946/47

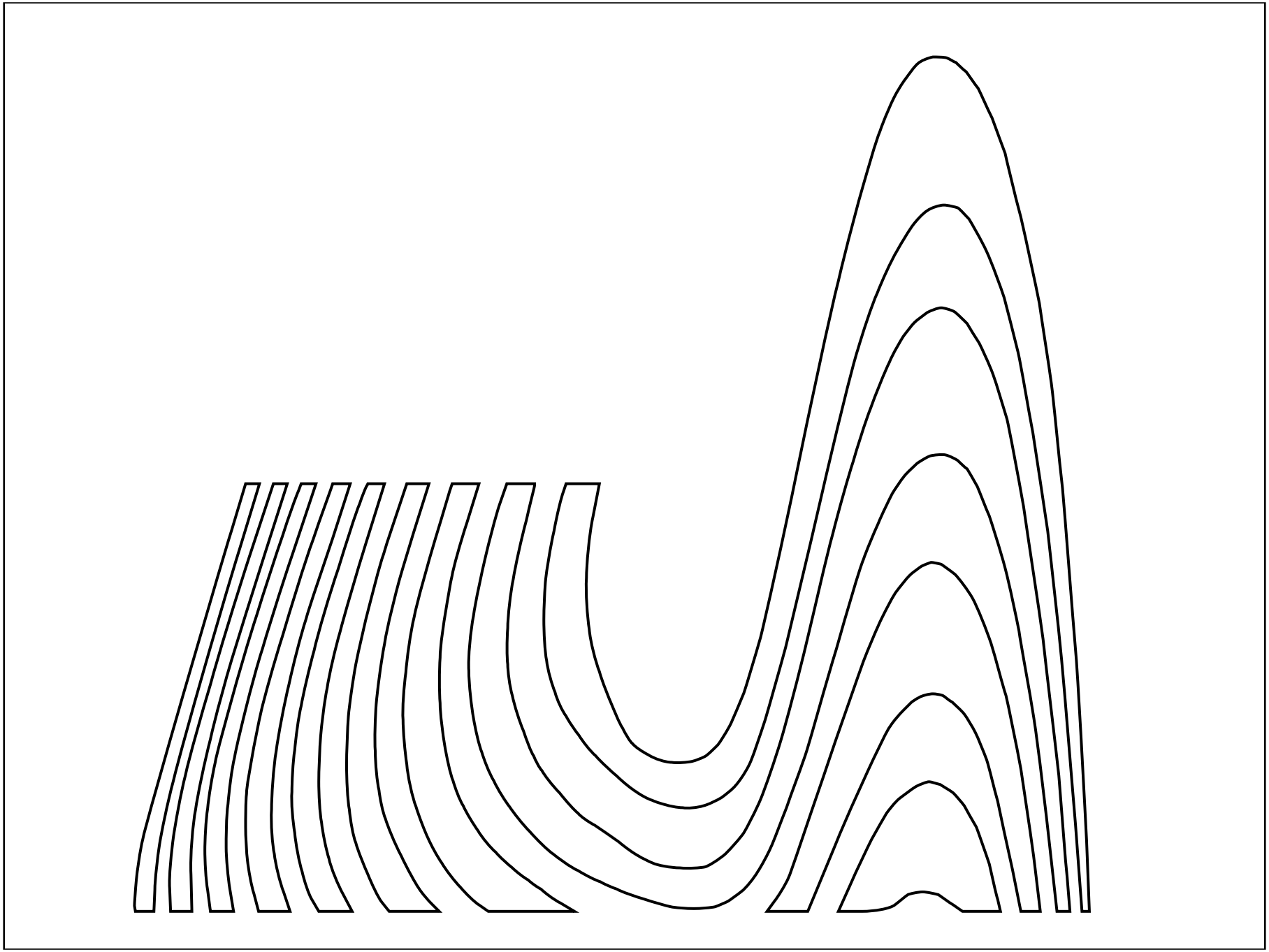
1946


Orgaan van de Vereniging voor Statistiek
statistica
neerlandica
CENTRAAL REKEN-INSTITUUT
DER RIJKSUNIVERSITEIT
Statistica Neerlandica Jaargang 13 nr 1 blz. 1–110 's-Gravenhage 1959

1959

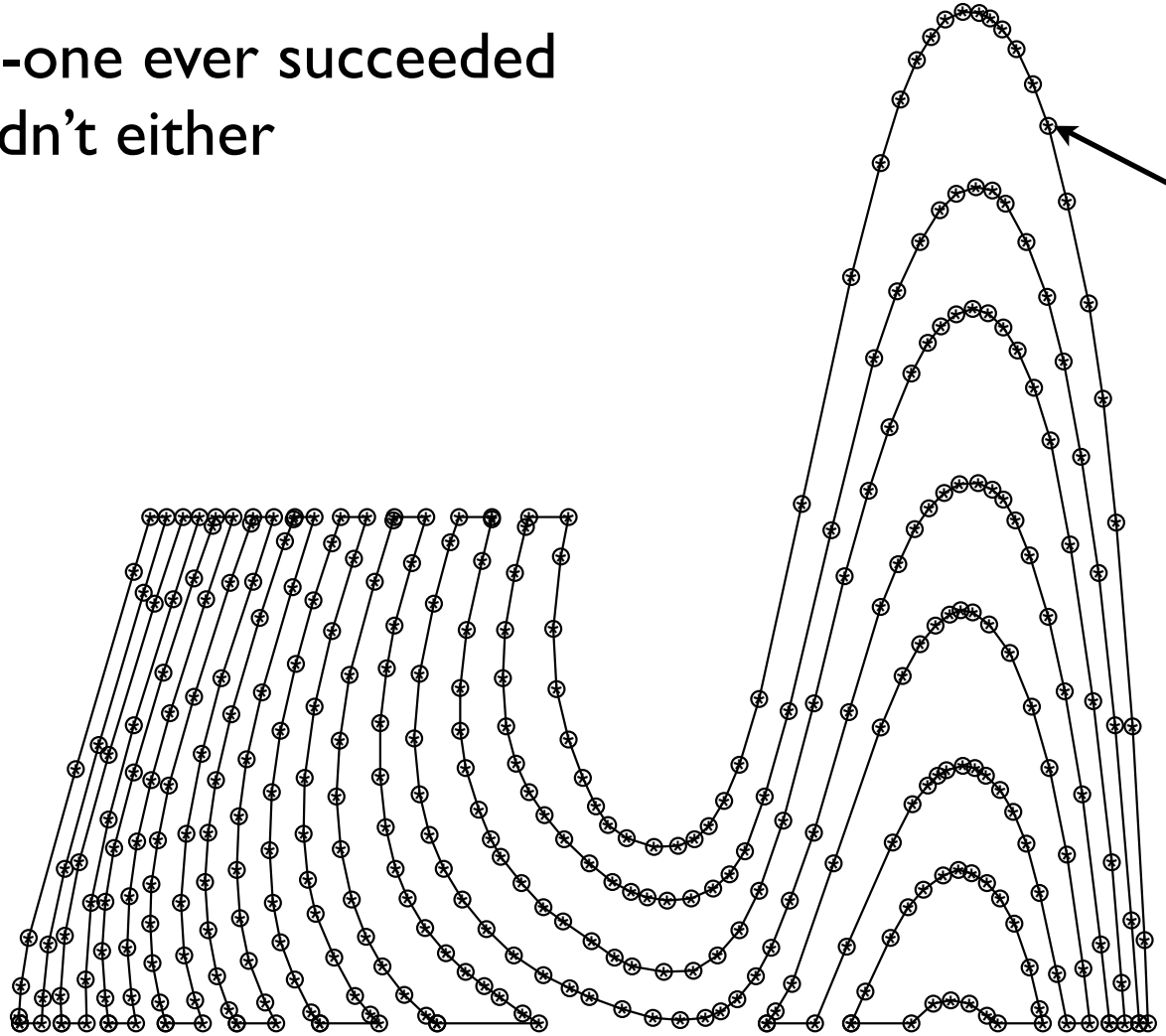
```
%!
%%Title:VVS-embleem
%%Creator:Alex Koning
%%CreationDate: 26 januari 1996
%%BoundingBox: 0 0 1031 923
%%EndComments

0.5 0.5 scale
100 400 translate

0 0 0 setrgbcolor

3 setlinewidth

newpath
   1    0 moveto
   0    6 lineto
   0    9    1   23    2   34 curveto
   3   44    6   66    9   78 curveto
  11   89   33  166   52  232 curveto
  71  297   97  387  105  412 curveto
 120  462 lineto
 135  462 lineto
 114  393 lineto
 103  358   83  289   73  254 curveto
  63  219   47  162   42  141 curveto
  36  119   29   85   27   72 curveto
  25   59   22   34   22   23 curveto
  21    0 lineto
closepath
stroke

newpath
  39    0 moveto
  38   25 lineto
  37   37   40   65   42   80 curveto
  44   94   50  128   55  147 curveto
  59  166   73  215   82  245 curveto
  90  275  111  343  124  383 curveto
```

421 lines of postscript



My *Modern Applied Statistics* Course Assignment:
Fit a smooth family of curves with parsimonious description

No-one ever succeeded
I didn't either

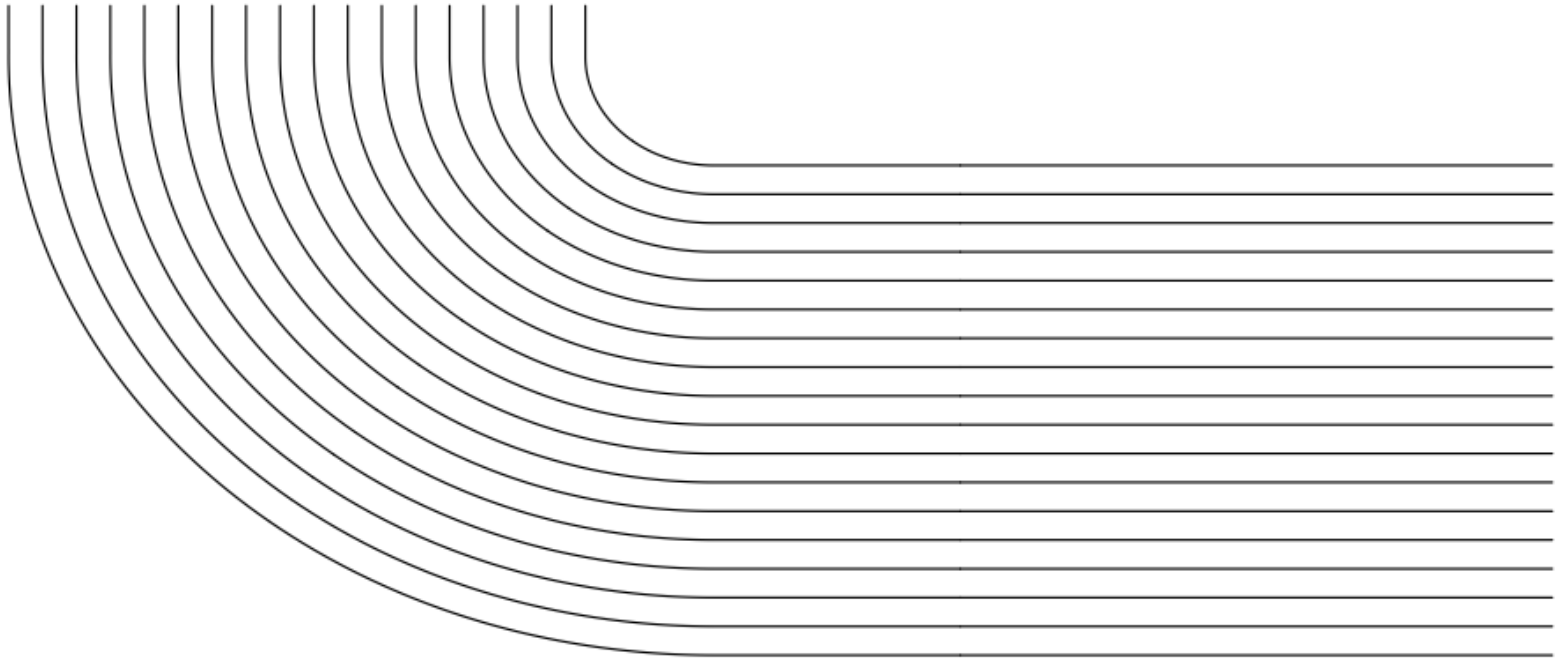


R plot of points listed in postscript file (postscript spline knots)

Insight

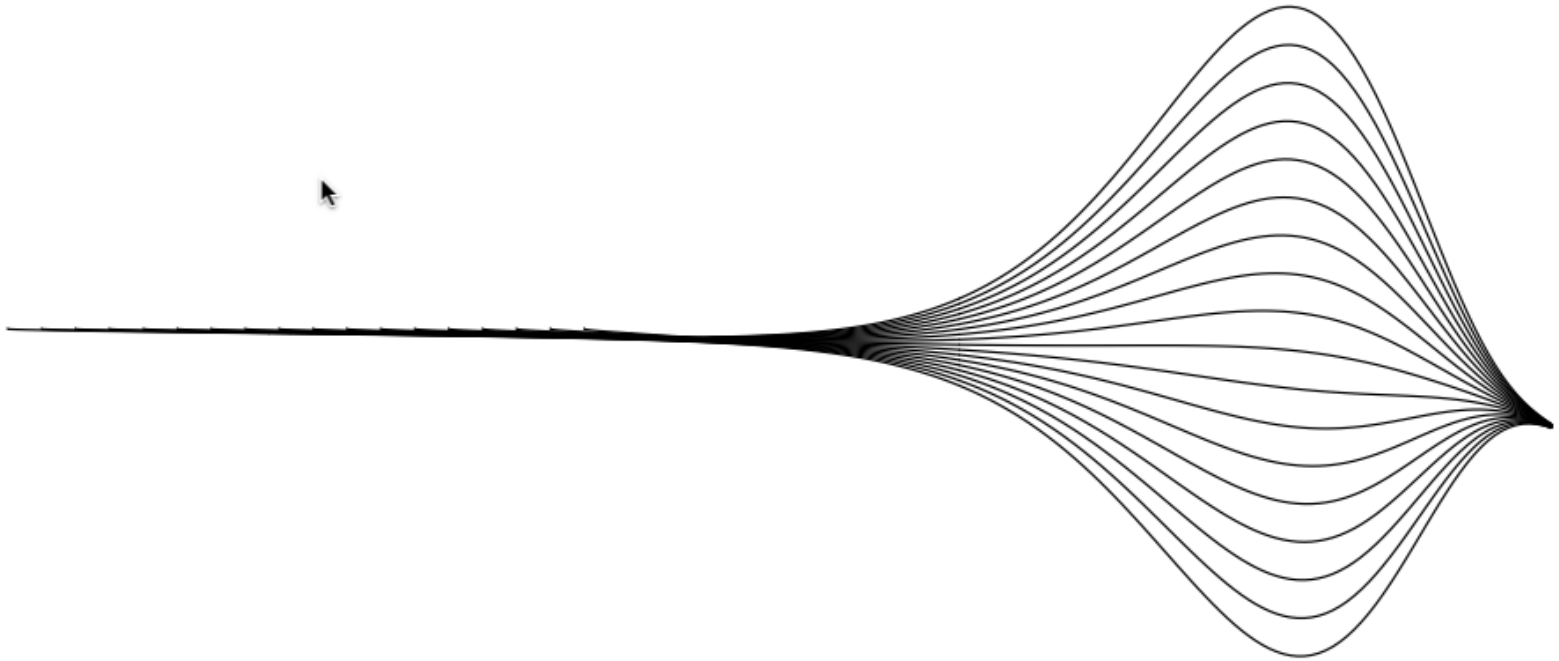
- It's a perspective image of a 3-d object: "9 parallel race tracks"
- To the right, they go over a sort-of normally shaped hill,
- viewpoint is close from above
- To the left they flatten out, then they curve back and recede into the distance
- Let's draw the 18 strip-edges in 3d

My solution:



The ground plan

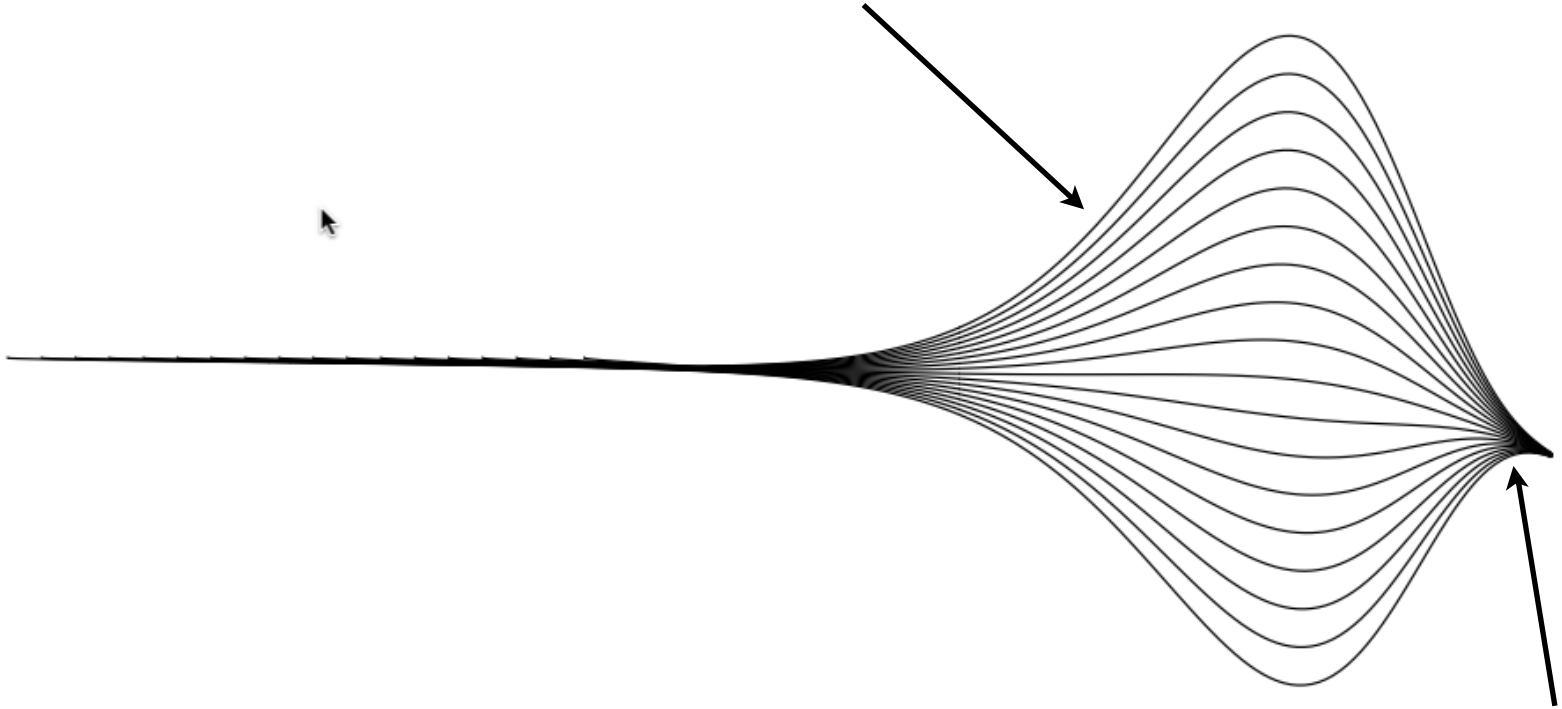
My solution:



The front view

My solution:

Gamma(7) probability densities (right to left)



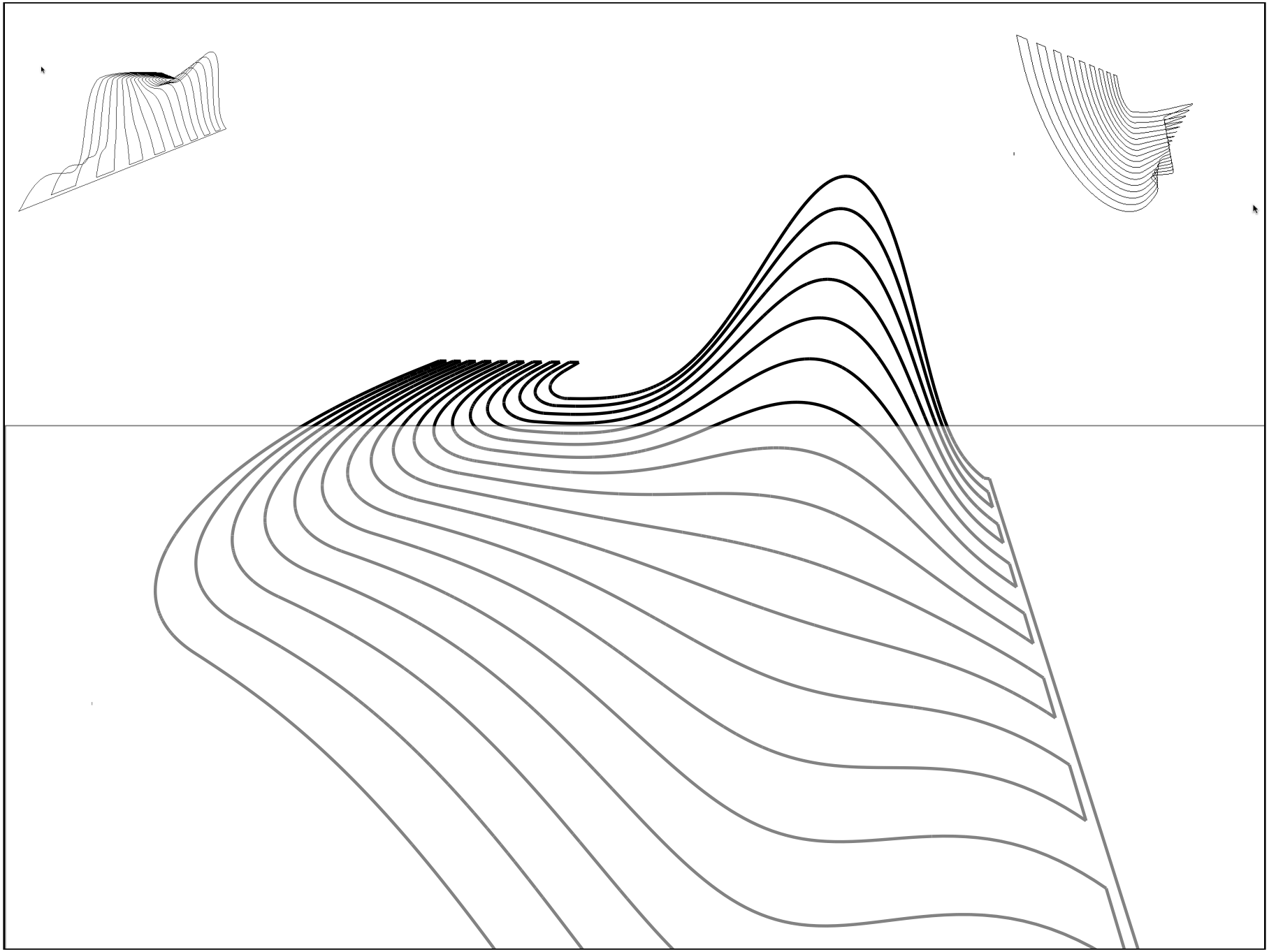
The front view

Earlier version had flat bottom – half a straight onion instead of a whole bent onion – but did not fit data so well

Live Demo

(download and run in R)

- Try it out: **R** script http://www.math.leidenuniv.nl/~gill/3dlogo.txt
- **rgl** package creates one rotatable 3d closed curve
- *Earlier version* had 9 black strips obtained by drawing many lines connecting opposite sides
- *Earlier version* had more simple code and more beautiful object but not so close to desired end result
- I'm a bad programmer so I don't have it any more (but I could easily make it again)



Postprocessing

- Fill the 9 strips for final scalable image:
  Export rgl image to svg, "ungroup" object & "join" many, many(!) pieces to one closed line in *Illustrator*.
  Save as postscript, fill closed line.
  Convert to svg or pdf or (nonscalable) jpeg ...
- There must be an easy way to end up with **nine** scalable **filled closed curves**
- Must make R description shorter while still fitting data (front view: half a straight onion)
- I'll give a prize to the person who can do this

VvS+OR
SMS

- I later asked Tobias Baanders what the idea had been for his design
  - Answer: he had 3-d perspective image in mind
- Long ago (when I was richard@mcvax.nl)
  I once had the following Unix *motd*:
  "life is like an onion: you peel off layer after layer only to find there's nothing inside"
  - My philosophy: it's between the layers where you find the meaning of life

End of part 1

Postscript to Part I

- Finally, my "solution" does not use statistics much, and why should it? We can now create more beautiful logos, and all kinds of variant logos
- Try again with Sage, http://www.sagemath.org/
  Free open source mathematics system, combining existing open-source packages into a common Python-based interface, slowly becoming a viable alternative to Magma, Maple, Mathematica and Matlab
- Sage has interfaces to R and LaTeX

Part 2: R on iOS ?

Sure, thanks to ech0chrome

- http://leafmoon.users.sourceforge.net/cydia/
- http://twitter.com/#!/ech0chrome
- Taiju Yamada <ech0chrome@104.net>

R on iOS

- First *jailbreak* iDevice – gain root priviledges and circumvent Apple restrictions (your legal right)
- Jailbreak restores hidden functionality and installs *Cydia* (App Store for lots more)
- Apple doesn't (yet) see difference & device can be restored to original state – no loss of warranty

Why jailbreak an iThing?

- iPhone, iPad speed, memory, storage, monitor (smaller pixels!) of typical 10 years old desktop, plus...
  - Internal *mobile* internet modem (3G cell phone)
  - Bluetooth, Wireless, USB connections...
  - Gorgeous GUI on top of a (BSD) UNIX
- *Apple* treats you like a child
- **Why climb Everest? Because it's there**

Jailbreaking

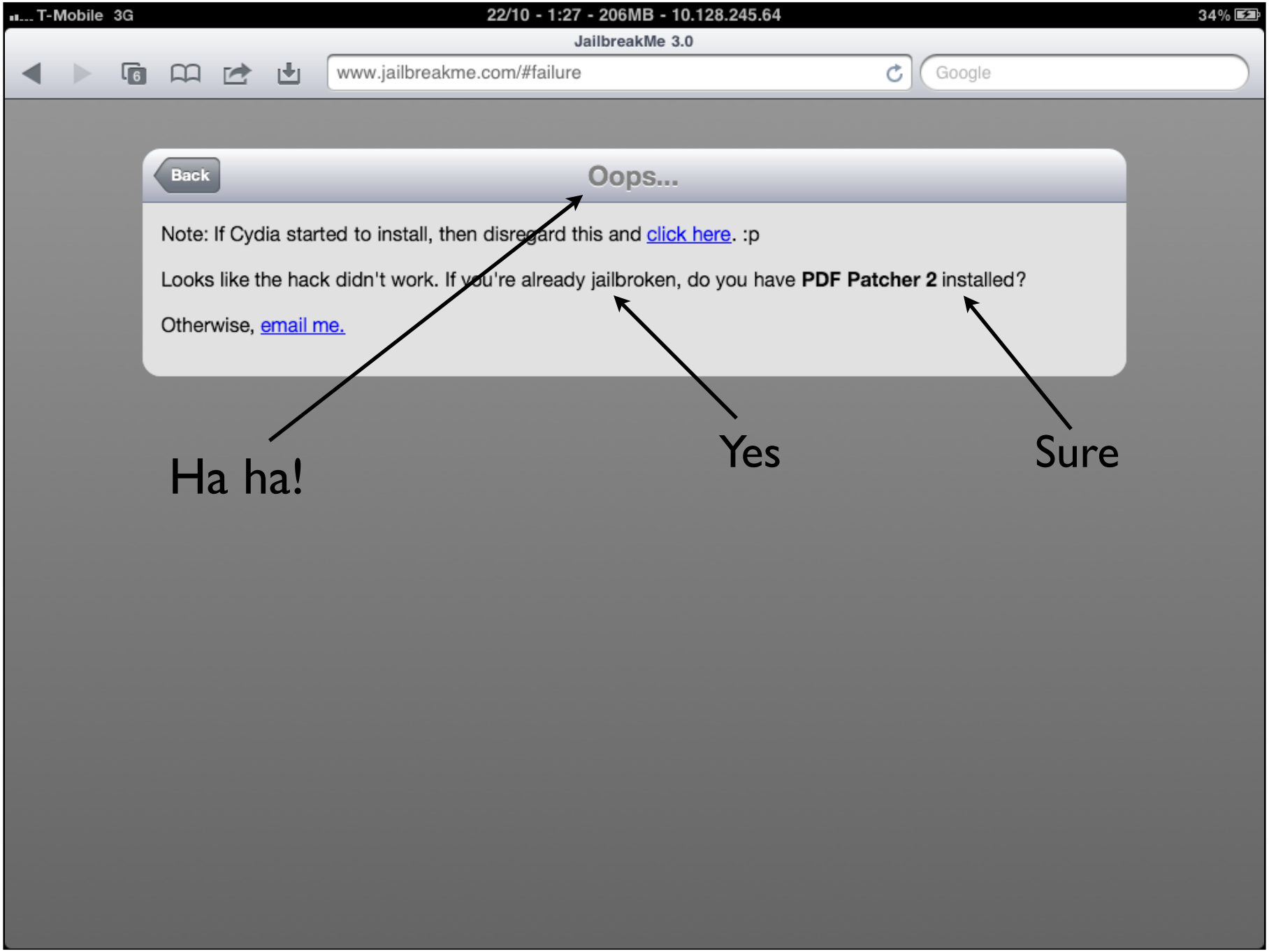
- On earlier iDevices and even latest iOS not difficult or risky (but make a backup first!).
  - Run greenp0ison / redsn0w / limeraIn on Mac or PC with iTunes, connected by USB
  - Uses known CPU architecture & vulnerabilities in Apple's boot process
- Alas, iPad2 and iPhone 4S have new secret Apple CPU
  - Only known jailbreak exploits bug in pdf display fixed *above* iOS 4.3.3
  - *Down*grading your currently installed iOS is impossible

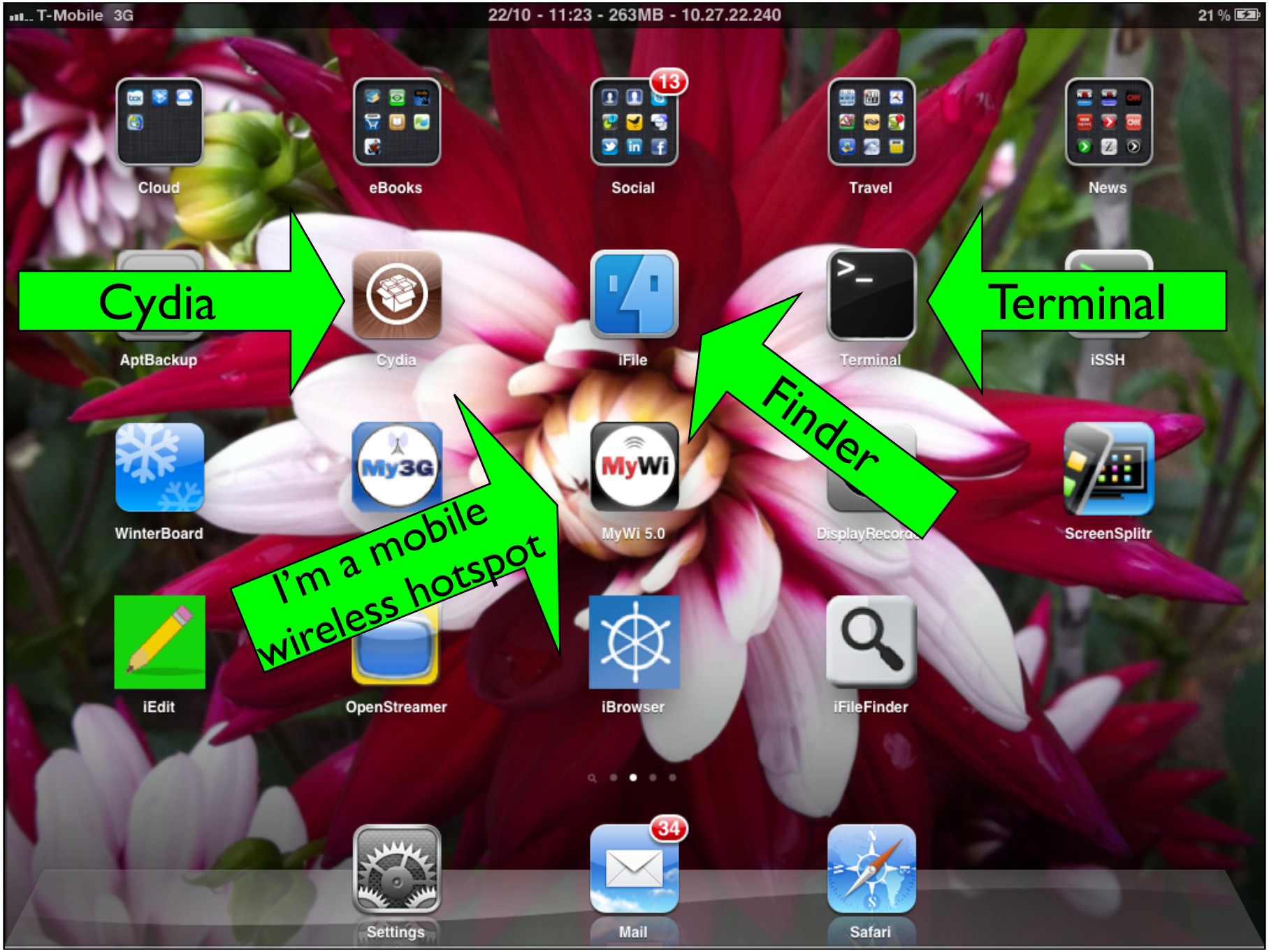
Jailbreaking iPad2, iOS 4.3.3

- Safari to Comex's http://www.jailbreakme.com
- Install-button is a link to a pdf file which Safari tries to view, crashing iOS
- In ensuing chaos, Cydia etc. is installed (from the "pdf" file)
- Install OpenSSH and change passwords (*alpine*) of root and of user (mobile)
- Install Comex' patch of the pdf bug from Cydia
- Don't upgrade iOS – jailbreak lost, no going back

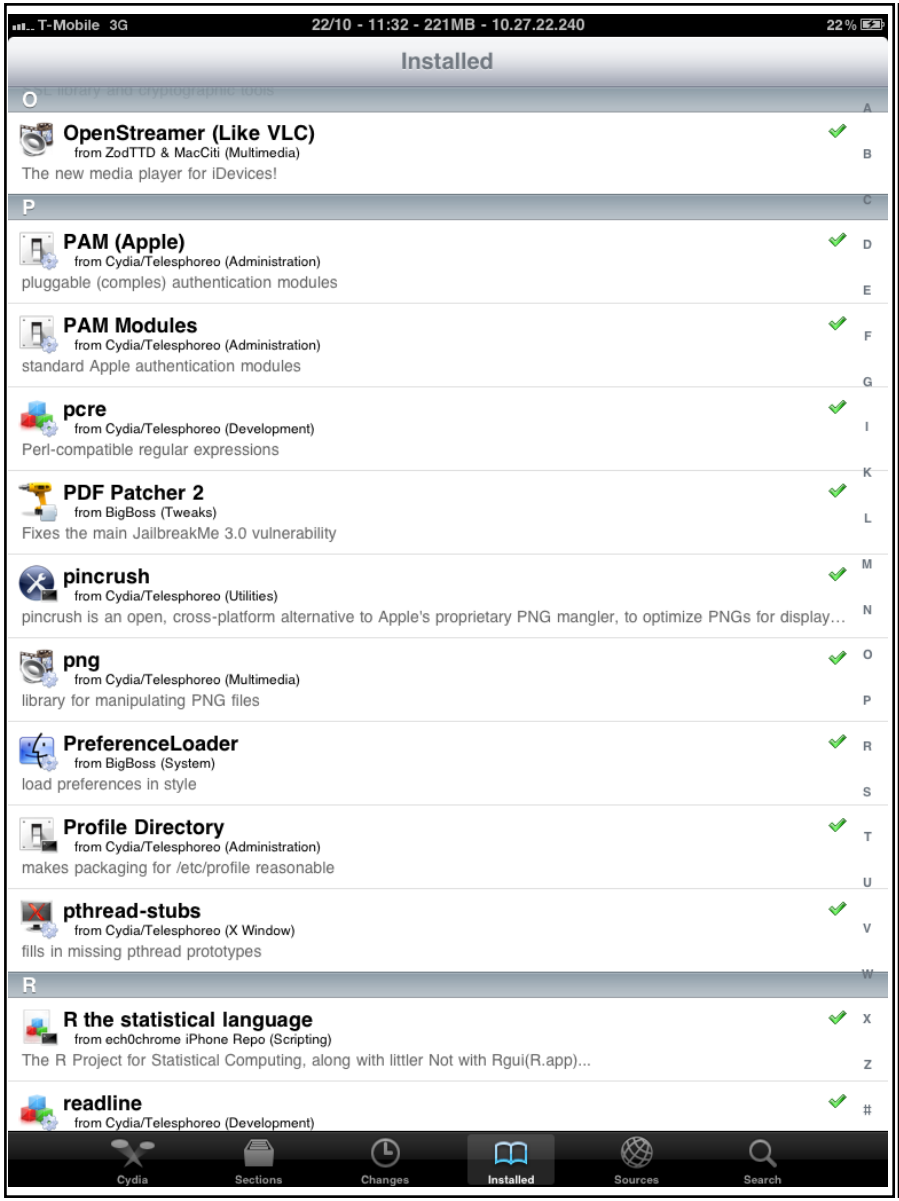
T-Mobile 3G
22/10 - 1:27 - 208MB - 10.128.245.64
34%
JailbreakMe 3.0
www.jailbreakme.com/
Google
JailbreakMe
Cydia
Jay Freeman (saurik)
Jailbreak by comex.
FREE
JailbreakMe is the easiest way to free your device. Experience iOS as it could be, fully customizable, themeable, and with every tweak you could possibly imagine.
Safe and completely reversible (just restore in iTunes), jailbreaking gives you control over the device you own. It only takes a minute or two, and as always, it's completely free.
Please make an iTunes backup before jailbreaking.
More Information
Tell a Friend
This jailbreak was brought to you by comex, with the help of Grant Paul (chpwn), Jay Freeman (saurik), MuscleNerd, and many others. Please don't use this for piracy. Donate?
Legal
Hit this button!

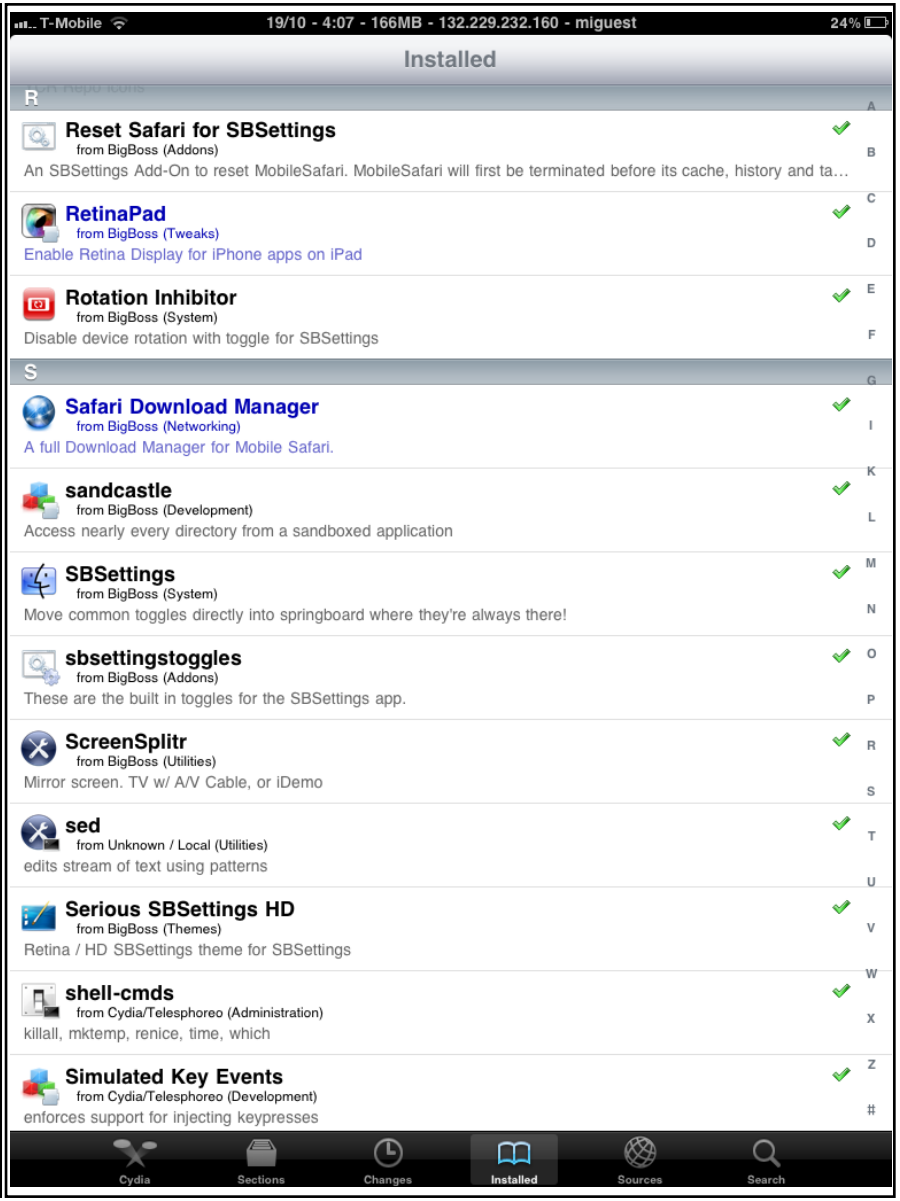
T-Mobile 3G
22/10 - 1:27 - 206MB - 10.128.245.64
34%
JailbreakMe 3.0
www.jailbreakme.com/
Google
JailbreakMe
Cydia
Jay Freeman (saurik)
Jailbreak by comex.
INSTALL
JailbreakMe is the easiest way to free your device. Experience iOS as it could be, fully customizable, themeable, and with every tweak you could possibly imagine.
Safe and completely reversible (just restore in iTunes), jailbreaking gives you control over the device you own. It only takes a minute or two, and as always, it's completely free.
Please make an iTunes backup before jailbreaking.
More Information
Tell a Friend
This jailbreak was brought to you by comex, with the help of Grant Paul (chpwn), Jay Freeman (saurik), MuscleNerd, and many others. Please don't use this for piracy. Donate?
Legal
Hit it again!


T-Mobile 3G
22/10 - 1:27 - 206MB - 10.128.245.64
34%
JailbreakMe 3.0
www.jailbreakme.com/#failure
Google
Back
Oops...
Note: If Cydia started to install, then disregard this and click here. :p
Looks like the hack didn't work. If you're already jailbroken, do you have PDF Patcher 2 installed?
Otherwise, email me.
Ha ha!
Yes
Sure


T-Mobile 3G
22/10 - 11:23 - 263MB - 10.27.22.240
21 %
Cloud
eBooks
Social
Travel
News
Cydia
AptBackup
Cydia
iFile
Terminal
iSSH
Terminal
Finder
WinterBoard
My3G
MyWi
MyWi 5.0
ScreenSplitr
I'm a mobile wireless hotspot
iEdit
OpenStreamer
iBrowser
iFileFinder
Settings
Mail
Safari

Cydia “Installed”, from O to S



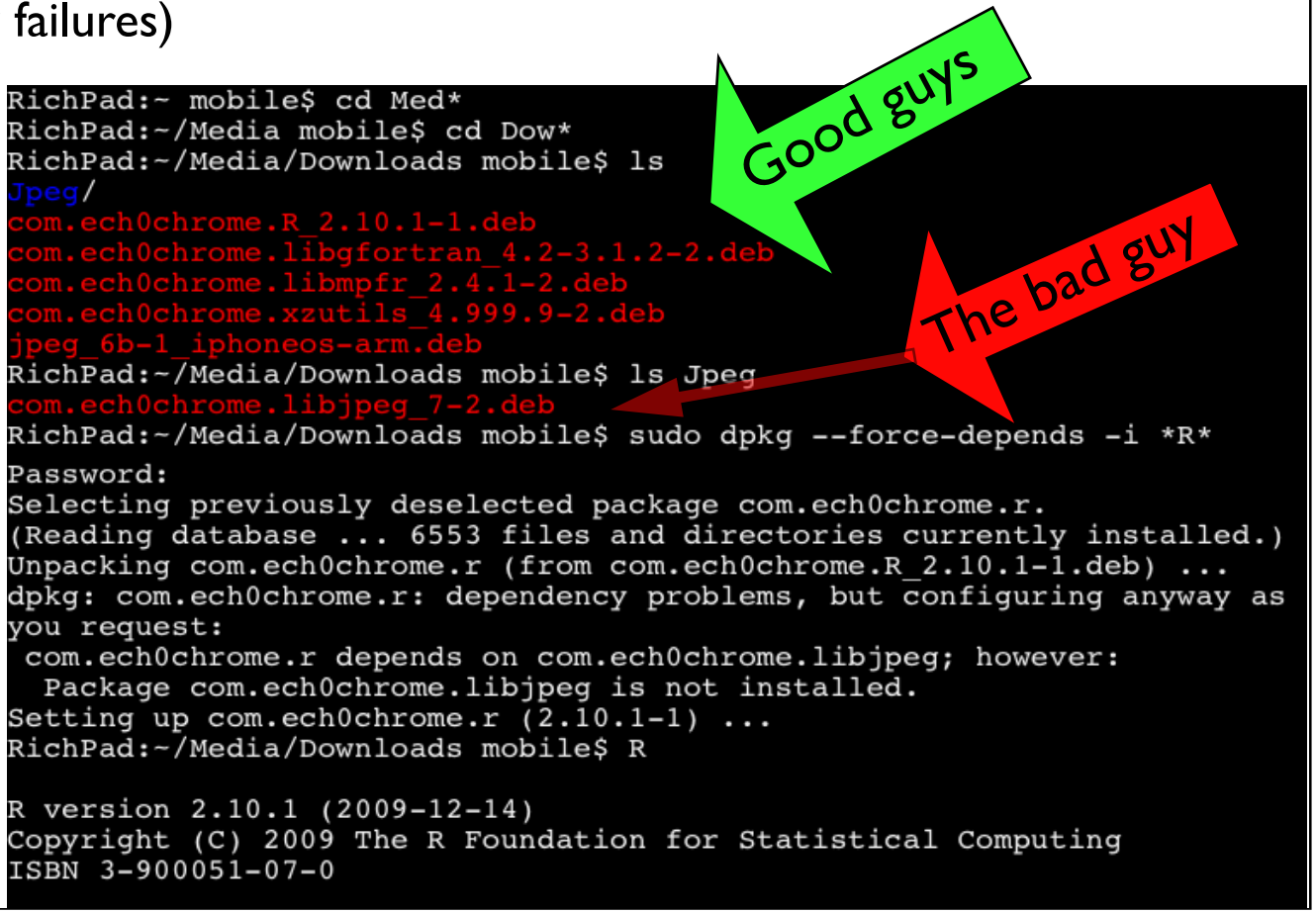


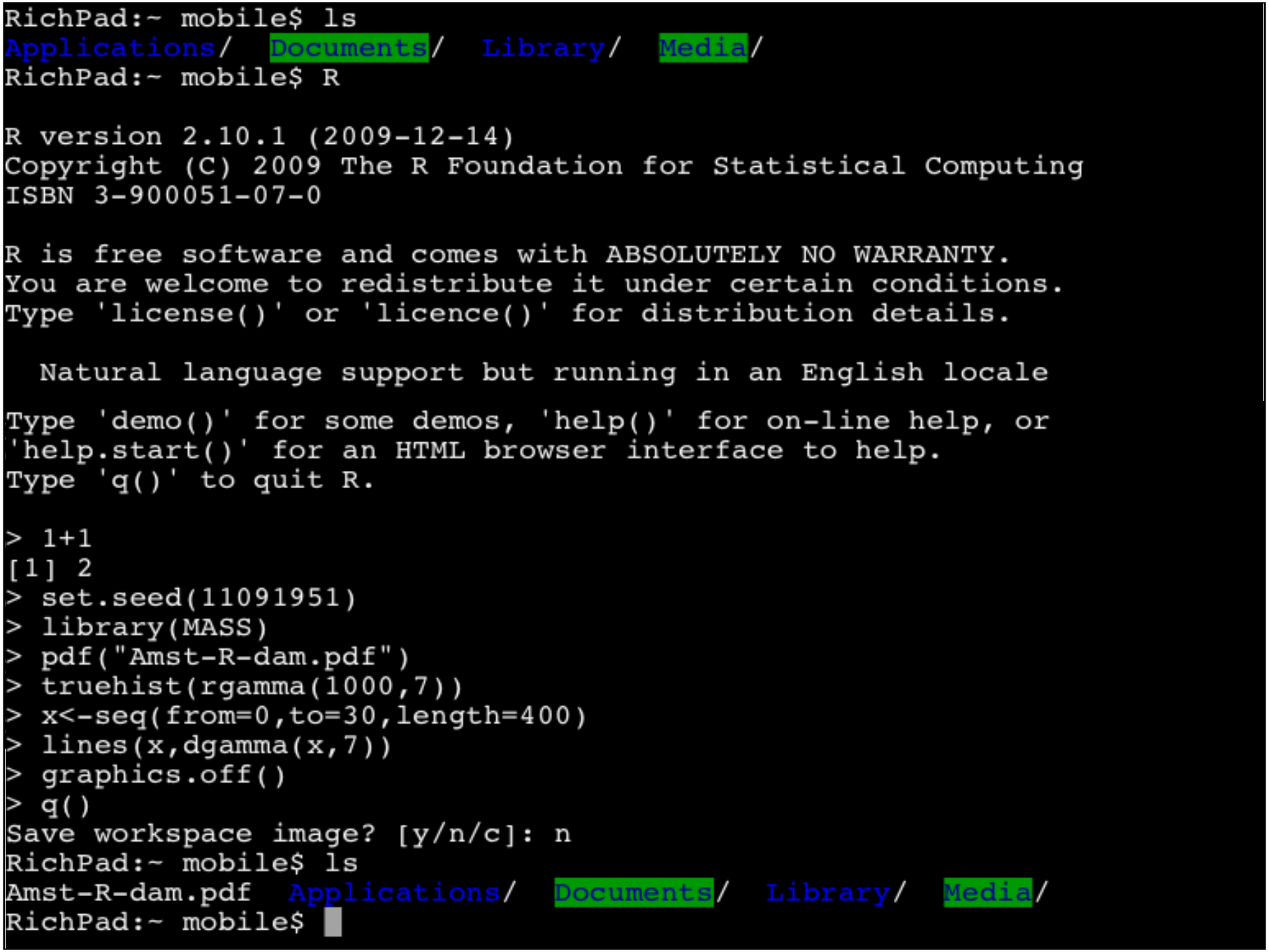
echo0chrome's R depends on several packages from his repository
Add this repo to your Cydia repo-list to install all dependencies automatically

Problem: R wants **jpeg** aka **libjpeg** for plot to .jpg file (so what: plot to pdf)
ech0chrome's R wants his v.7; some Cydia apps want Cydia's v.6.
Work-around: enable repo, install dependencies (except libjpeg) by Cydia
Download ech0chrome's R-installer, install R from terminal with --force-depends (overrides dependency failures)

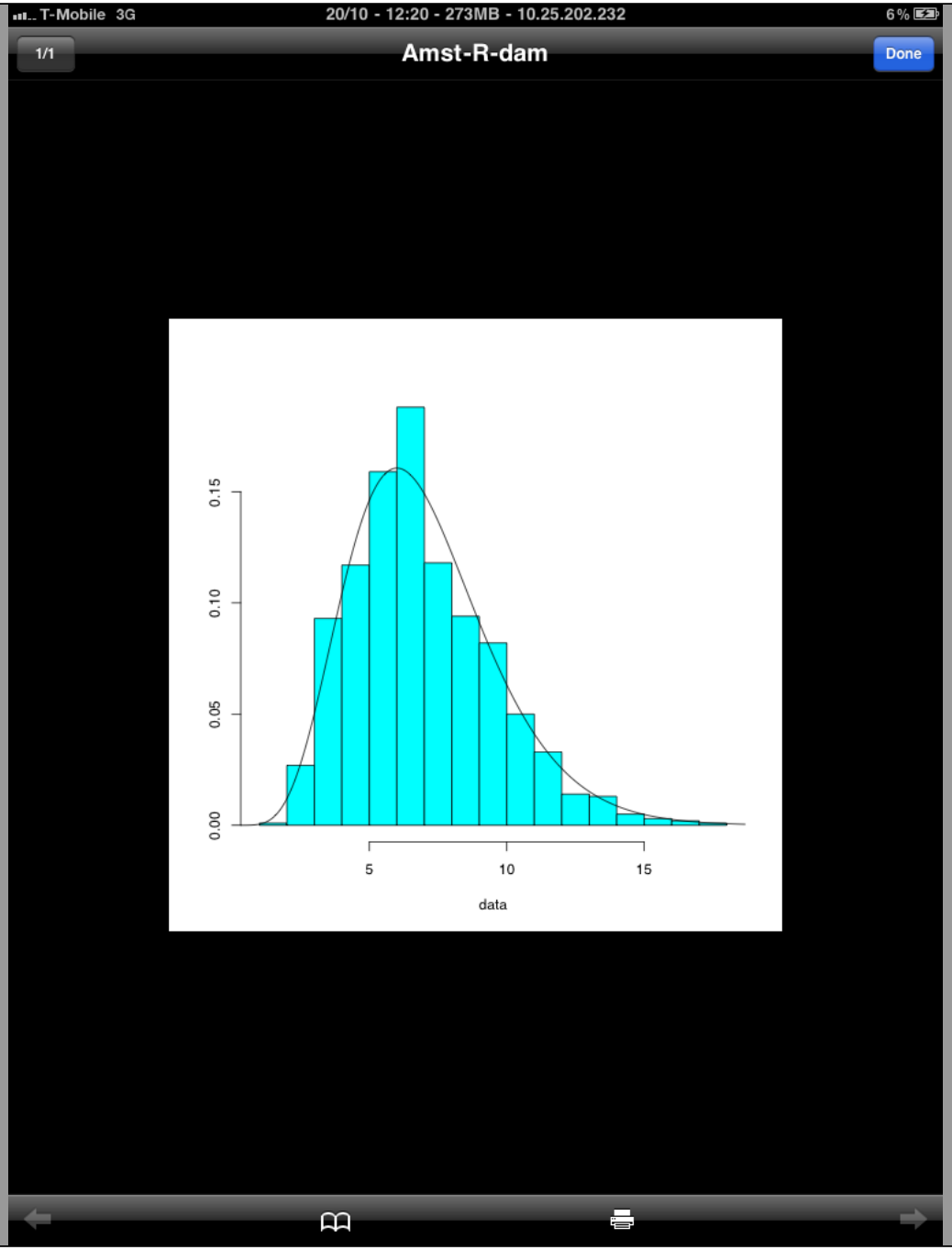
Jailbreak enables download of arbitrary files by Safari & from mail attachments by Mail – both disabled by Apple!

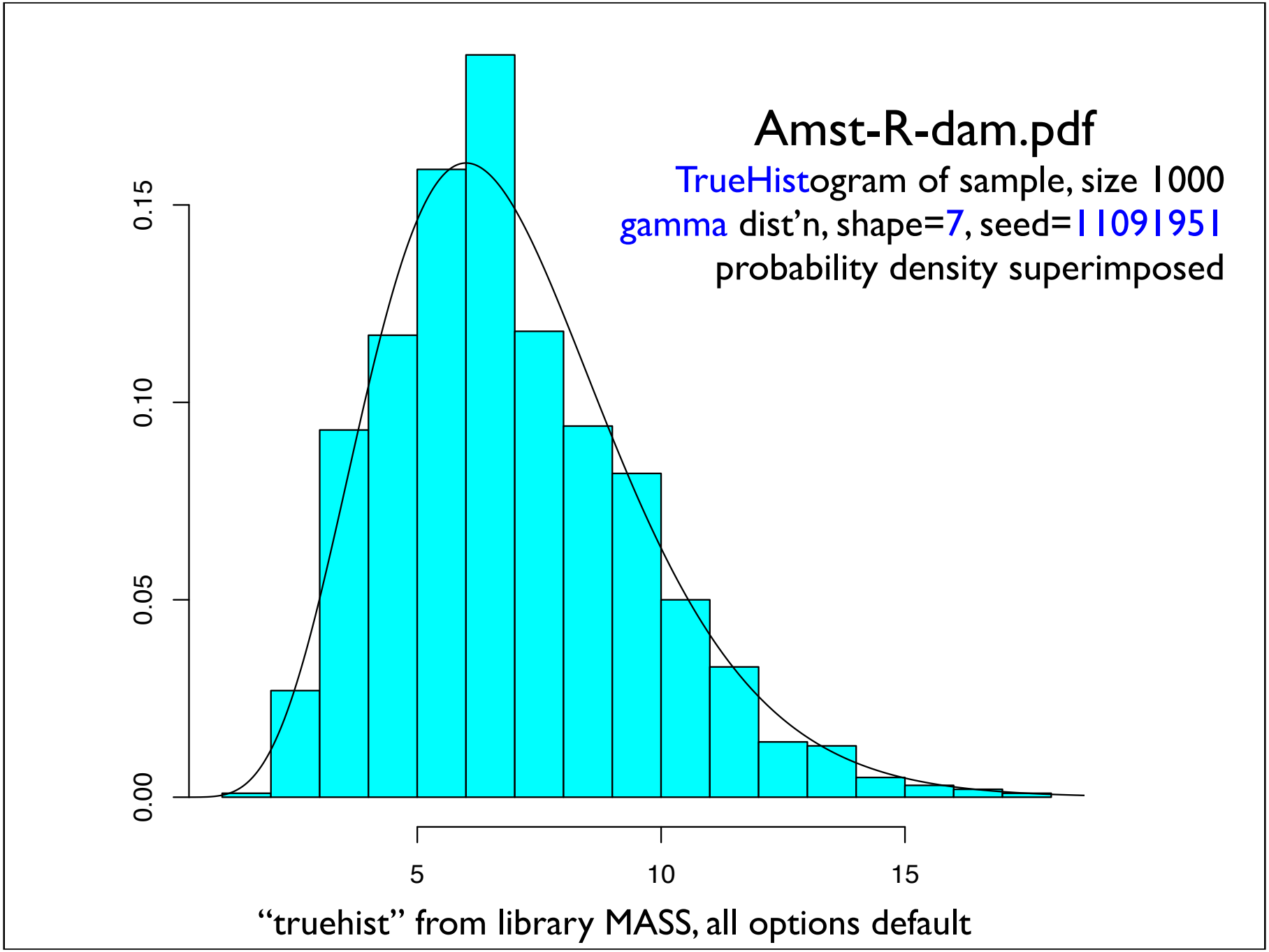
Alternatively, build R yourself!




RichPad:~ mobile$ ls
Applications/ Documents/ Library/ Media/
RichPad:~ mobile$ R
R version 2.10.1 (2009-12-14)
Copyright (C) 2009 The R Foundation for Statistical Computing
ISBN 3-900051-07-0
R is free software and comes with ABSOLUTELY NO WARRANTY.
You are welcome to redistribute it under certain conditions.
Type 'license()' or 'licence()' for distribution details.
Natural language support but running in an English locale
Type 'demo()' for some demos, 'help()' for on-line help, or
'help.start()' for an HTML browser interface to help.
Type 'q()' to quit R.
> 1+1
[1] 2
> set.seed(11091951)
> library(MASS)
> pdf("Amst-R-dam.pdf")
> truehist(rgamma(1000,7))
> x<-seq(from=0,to=30,length=400)
> lines(x,dgamma(x,7))
> graphics.off()
> q()
Save workspace image? [y/n/c]: n
RichPad:~ mobile$ ls
Amst-R-dam.pdf Applications/ Documents/ Library/ Media/
RichPad:~ mobile$

Open in pdf - viewer from Finder



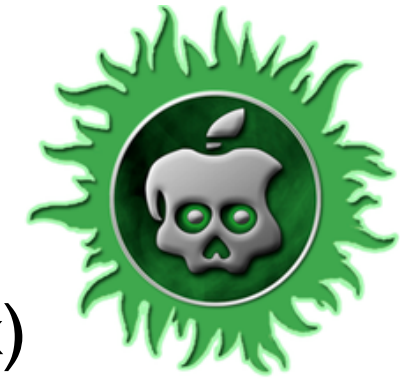

Amst-R-dam.pdf
TrueHistogram of sample, size 1000
gamma dist'n, shape=7, seed=11091951
probability density superimposed
0.00
0.05
0.10
0.15
5
10
15
"truehist" from library MASS, all options default

Have fun!

- Now we wait for LaTeX on iOS
- Remember to change the passwords of **root** and of **mobile** from **alpine** to ...
- Be prepared for annoyance as Apple, hackers, play cat and mouse
- Beware of scams and rumours, don't pay anyone anything!
- Don't count on jailbreak still being possible a few models / iOS versions later

Postscript to Part 2

- iPad2, iPhone 4S (iOS 5.0.1) have jailbreak: "Absinthe"
- It's (usually) fast and easy
  (do it alongside a good cup of coffee, relax)



- Don't hurry, be careful. **Backup** over iTunes, allow time for iOS **Restore** (needs internet connection to Apple!) *just in case* something goes wrong
- Do before release of next revision of iOS:
  Apple only allows "Restore" to *latest version* of iOS

Postscript to Part 2 (continued)

- http://gamma-level.com/iphoneos/ports/texlive (Aaron Griffith) provides Cydia-based install of *LaTeX*
  - Just needs *Perl* from http://coredev.nl/
  - iOS hard disk has small partition for system, large partition for user. But you can move, symlink /usr/local (system partition) to /private/var/local (user partition), see http://coredev.nl/
- Griffith also explains how to make your own build, could be useful for learning how to add Sage, ... !

Update 3 July 2012

- Now at iOS 5.1.1: jailbreak with redsn0w or absinthe
- R installation problem with "jpeg" incompatibility no longer exists
- New R incompatibility problem with "TruPrint" (v. useful Cydia app: print to pdf); solution, install R first, then TruPrint)
- LaTeX installs fine, note: TruPrint already moves and sim-links "local" to user partition. So if you have TruPrint, you can omit this step.
- After installation, the LaTeX executables need to be "signed". Aaron Griffiths: "iOS 5 is a little bit more strict about what executables it will run than older versions. The fix is pretty easy but I haven't had a chance to release a new version of my LaTeX packages. I've heard of this problem a few times now, so I've written a script which will pseudo-sign all the LaTeX executables so that they will run again. You'll need a tool called `ldid` to run this script; either install it through Cydia or run "apt-get install ldid" as root. Then download this script, and run it (also as root) http://gammalevel.com/forever/pseudosign-latex.sh . This script simply runs `ldid -S ...` on each LaTeX executable, which you could do manually if you want. There's a lot of them though, so the script is much more convenient.

T-Mobile 3G
22/10 - 12:47 - 219MB - 10.128.245.64
29 %
Terminal
iFile
R inside
The End
VvS+OR
SMS
App Store
Cydia