

IX WORKSHOP DE FÉRIAS EM
GENÉTICA E MELHORAMENTO
DE PLANTAS – 2015

Biotecnologia e Suas Aplicações na Genética e Melhoramento de Plantas



Introdução ao R

Cristiane Taniguti
Fernando Correr
Letícia Lara
Marianella Quezada



PATROCÍNIO



APOIO



Genética e
Melhoramento
de Plantas



1 Breve histórico

- Linguagem S
- Ambiente R

2 Instalação do R e RStudio

- Instalação do R
- Instalação do RStudio

3 Recomendações

Breve histórico

Linguagem S

Ambiente R

Instalação do R e RStudio

Instalação do R

Instalação do RStudio

Recomendações

"We were looking for a system to support the research and the substantial data analysis projects in the statistics research group at Bell Labs"

(...)

We wanted users to be able to begin in an interactive environment, where they did not consciously think of themselves as programming. Then as their needs became clearer and their sophistication increased, they should be able to slide gradually into programming, when the language and system aspects would become more important. This philosophy would be articulated explicitly later, but it was implicit from the start."

Stages in the Evolution of S - John Chambers, 2000

Breve histórico

Linguagem S

Ambiente R

Instalação do R e RStudio

Instalação do R

Instalação do RStudio

Recomendações

Aperfeiçoamento com o passar do tempo gerou várias versões da linguagem:

- (1984) *S: An Interactive for Data Analysis and Graphics* - Livro Marrom
- (1988) *The New S Language* - Livro Azul
- (1991) *Statistical Models in S* - Livro Branco
- (2004) *Programming with data* - Livro Verde



- R é o dialeto da linguagem S mais difundido
- (1991) Desenvolvida por Ross Ihaka e Robert Gentleman na Universidade de Auckland, Nova Zelândia



Ross Ihaka & Robert Gentleman (1996)

R: A Language for Data Analysis and Graphics

Journal of Computational and Graphical 5(3), 299
– 314.

- (2000) Versão 1.0.0
- (2013) Versão 3.0.2
- Continua sendo desenvolvido por *R Development Core Team*, da qual **John Chambers** faz parte

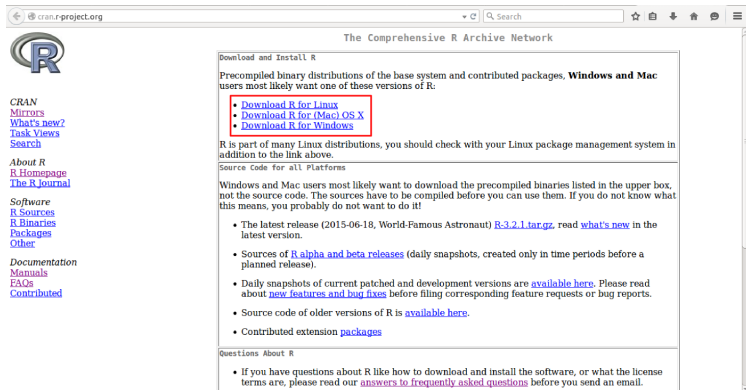
(1995) Martin Mächler convenceu criadores liberar o código fonte do R como um "software livre" sob os termos da *Free Software Foundation's GNU general license*

- Software livre:
 - Liberdade 0 - Rodar o programa para qualquer propósito
 - Liberdade 1 - Estudar como o programa funciona e adaptar isso aos seus interesses
 - Liberdade 2 - Distribuir cópias
 - Liberdade 3 - Aprimorar o programa e liberar para a comunidade acesso ao código fonte

Por que chamar de "Ambiente"?

- R é um ambiente de software livre para computação e gráficos estatísticos, consiste numa ferramenta ampla e flexível
- Funcionalidades distribuídas em pacotes armazenados em repositórios como:
 - (16/06/2015) 6789 pacotes contidos no repositório [CRAN](#)
 - [Bioconductor](#)
 - [Omegahat](#)
 - [Github](#)

Fazer download pelo site: cran.r-project.org



The screenshot shows a web browser window with the address bar containing 'cran.r-project.org'. The page title is 'The Comprehensive R Archive Network'. The main content area is titled 'Download and Install R' and contains the following text:

Precompiled binary distributions of the base system and contributed packages, **Windows and Mac** users most likely want one of these versions of R:

- [Download R for Linux](#)
- [Download R for \(Mac\) OS X](#)
- [Download R for Windows](#)

R is part of many Linux distributions, you should check with your Linux package management system in addition to the link above.

Source Code for all Platforms

Windows and Mac users most likely want to download the precompiled binaries listed in the upper box, not the source code. The sources have to be compiled before you can use them. If you do not know what this means, you probably do not want to do it!

- The latest release (2015-06-18, World-Famous Astronaut) [R-3.2.1.tar.gz](#), read [what's new](#) in the latest version.
- Sources of [R alpha and beta releases](#) (daily snapshots, created only in time periods before a planned release).
- Daily snapshots of current patched and development versions are [available here](#). Please read about [new features and bug fixes](#) before filing corresponding feature requests or bug reports.
- Source code of older versions of R is [available here](#).
- Contributed extension [packages](#)

Questions About R

- If you have questions about R like how to download and install the software, or what the license terms are, please read our [answers to frequently asked questions](#) before you send an email.

On the left side of the browser window, there is a navigation menu with the following links:

- CRAN
- [Mirrors](#)
- [What's new?](#)
- [Task Views](#)
- [Search](#)
- About R
- [R Homepage](#)
- [The R Journal](#)
- Software
- [R Sources](#)
- [R Binaries](#)
- [Packages](#)
- [Other](#)
- Documentation
- [Manuals](#)
- [FAQs](#)
- [Contributed](#)

Breve histórico

Linguagem R

Ambiente R

Instalação do R e
RStudio

Instalação do R

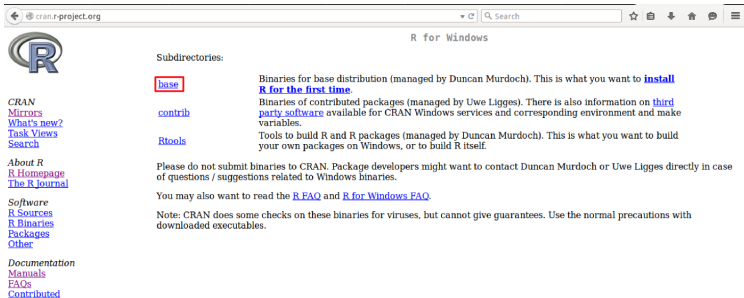
Instalação do RStudio

Recomendações

Instalação do R para Windows

Introdução ao R

Cristiane Taniguti
Fernando Correr
Letícia Lara
Marianella
Quezada



The screenshot shows a web browser window with the address bar containing "cran.r-project.org". The page title is "R for Windows". The main content area is titled "Subdirectories:" and lists three links: "base", "contrib", and "Rtools". The "base" link is highlighted with a red box. To the right of each link is a short description of the subdirectory's content. Below the subdirectories, there is a note about submitting binaries to CRAN and a link to the R FAQ and R for Windows FAQ. On the left side of the page, there are several navigation links under the heading "CRAN", including "About R", "R Homepage", "The R Journal", "Software", "R Sources", "R Binaries", "Packages", "Other", "Documentation", "Manuals", "FAQs", and "Contributed".

cran.r-project.org

R for Windows

Subdirectories:

- [base](#) Binaries for base distribution (managed by Duncan Murdoch). This is what you want to **install R for the first time**.
- [contrib](#) Binaries of contributed packages (managed by Uwe Ligges). There is also information on [third party software](#) available for CRAN Windows services and corresponding environment and make variables.
- [Rtools](#) Tools to build R and R packages (managed by Duncan Murdoch). This is what you want to build your own packages on Windows, or to build R itself.

Please do not submit binaries to CRAN. Package developers might want to contact Duncan Murdoch or Uwe Ligges directly in case of questions / suggestions related to Windows binaries.

You may also want to read the [R FAQ](#) and [R for Windows FAQ](#).

Note: CRAN does some checks on these binaries for viruses, but cannot give guarantees. Use the normal precautions with downloaded executables.

CRAN
[Mirrors](#)
[What's new?](#)
[Task Views](#)
[Search](#)

About R
[R Homepage](#)
[The R Journal](#)

Software
[R Sources](#)
[R Binaries](#)
[Packages](#)
[Other](#)

Documentation
[Manuals](#)
[FAQs](#)
[Contributed](#)

Breve histórico

Linguagem S
Ambiente R

Instalação do R e
RStudio

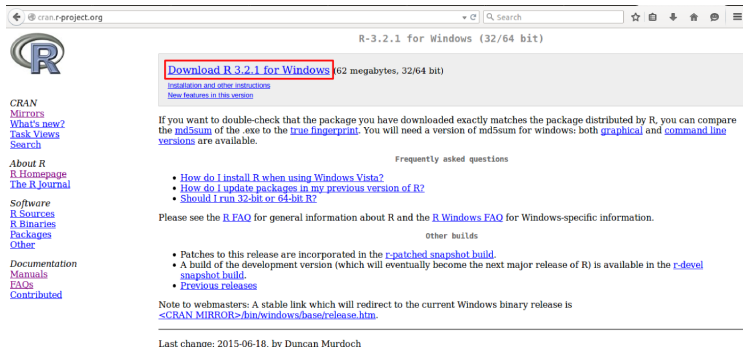
Instalação do R
Instalação do RStudio

Recomendações

Instalação do R para Windows

Introdução ao R

Cristiane Taniguti
Fernando Corrêa
Letícia Lara
Marianella
Quezada



The screenshot shows the CRAN website for R 3.2.1 for Windows (32/64 bit). The browser address bar shows 'cran.r-project.org'. The main content area features a highlighted link 'Download R 3.2.1 for Windows' (62 megabytes, 32/64 bit) with sub-links for 'Installation and other instructions' and 'New features in this version'. Below this, there is a section for 'Frequently asked questions' with three bullet points: 'How do I install R when using Windows Vista?', 'How do I update packages in my previous version of R?', and 'Should I run 32-bit or 64-bit R?'. A note states: 'Please see the R FAQ for general information about R and the R Windows FAQ for Windows-specific information.' Under 'Other builds', there are three bullet points: 'Patches to this release are incorporated in the r-patched snapshot build.', 'A build of the development version (which will eventually become the next major release of R) is available in the r-devel snapshot build.', and 'Previous releases'. A note to webmasters says: 'Note to webmasters: A stable link which will redirect to the current Windows binary release is <CRAN_MIRROR>/bin/windows/base/release.htm.' The footer indicates 'Last change: 2015-06-18, by Duncan Murdoch.'

cran.r-project.org

R-3.2.1 for Windows (32/64 bit)

[Download R 3.2.1 for Windows](#) (62 megabytes, 32/64 bit)

[Installation and other instructions](#)

[New features in this version](#)

If you want to double-check that the package you have downloaded exactly matches the package distributed by R, you can compare the [md5sum](#) of the .exe to the [true fingerprint](#). You will need a version of md5sum for windows: both [graphical](#) and [command line versions](#) are available.

Frequently asked questions

- [How do I install R when using Windows Vista?](#)
- [How do I update packages in my previous version of R?](#)
- [Should I run 32-bit or 64-bit R?](#)

Please see the [R FAQ](#) for general information about R and the [R Windows FAQ](#) for Windows-specific information.

Other builds

- Patches to this release are incorporated in the [r-patched snapshot build](#).
- A build of the development version (which will eventually become the next major release of R) is available in the [r-devel snapshot build](#).
- [Previous releases](#)

Note to webmasters: A stable link which will redirect to the current Windows binary release is [<CRAN_MIRROR>/bin/windows/base/release.htm](#).

Last change: 2015-06-18, by Duncan Murdoch

CRAN
[Mirrors](#)
[What's new?](#)
[Task Views](#)
[Search](#)

About R
[R Homepage](#)
[The R Journal](#)

Software
[R Sources](#)
[R Binaries](#)
[Packages](#)
[Other](#)

Documentation
[Manuals](#)
[FAQs](#)
[Contributed](#)

Breve histórico

Linguagem S

Ambiente R

Instalação do R e
RStudio

Instalação do R

Instalação do RStudio

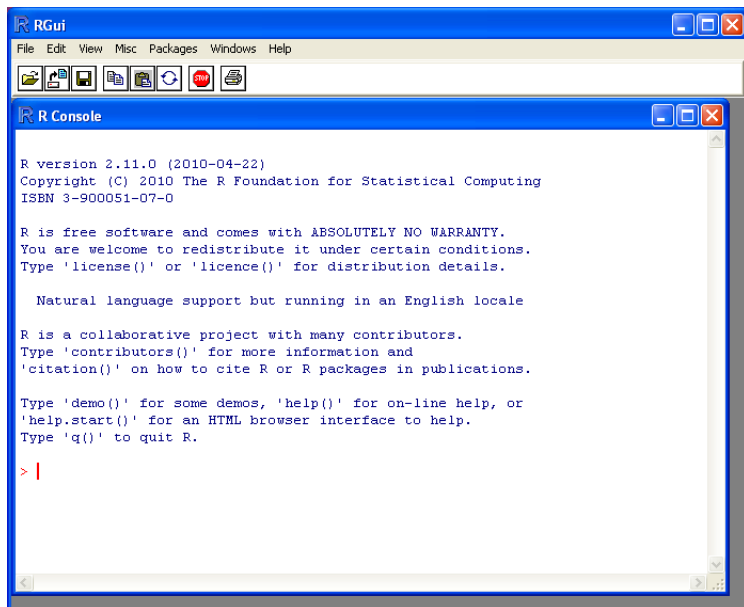
Recomendações

● Executar o arquivo

Instalação do R para Windows

Introdução ao R

Cristiane Taniguti
Fernando Correr
Letícia Lara
Marianella
Quezada



The screenshot shows the R GUI window with the following content in the R Console:

```
R version 2.11.0 (2010-04-22)
Copyright (C) 2010 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

R is a collaborative project with many contributors.
Type 'contributors()' for more information and
'citation()' on how to cite R or R packages in publications.

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.

> |
```

Breve histórico

Linguagem S

Ambiente R

Instalação do R e
RStudio

Instalação do R

Instalação do RStudio

Recomendações

Existem diversas maneiras, a mais simples:

```
sudo apt-get install r-base #Para Ubuntu e derivados
sudo yum install R # Para Fedora
#Para debian, torne-se root e digite
apt-get install r-base
```

Instalação do R para Linux

Introdução ao R

Cristiane Taniguti
Fernando Correr
Letícia Lara
Marianella
Quezada

```
cristiane@droid1: ~
cristiane@droid1:~$ R

R version 3.2.1 (2015-06-18) -- "World-Famous Astronaut"
Copyright (C) 2015 The R Foundation for Statistical Computing
Platform: x86_64-pc-linux-gnu (64-bit)

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

R is a collaborative project with many contributors.
Type 'contributors()' for more information and
'citation()' on how to cite R or R packages in publications.

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.

> 2+2
[1] 4
> cat("Hello", "World!", "\n")
Hello World!
> getwd()
[1] "/home/cristiane"
> setwd("/home/cristiane/Documents/")
> getwd()
[1] "/home/cristiane/Documents"
>
```

Breve histórico

Linguagem S

Ambiente R

Instalação do R e
RStudio

Instalação do R

Instalação do RStudio

Recomendações

Instalação do RStudio

Introdução ao R

Cristiane Taniguti
Fernando Correr
Letícia Lara
Marianella
Quezada

https://www.rstudio.com

R Studio

Products Resources Pricing About Us Blog

Welcome to RStudio - Open source and enterprise-ready professional software for R

Download RStudio

Discover Shiny

Powerful IDE for R
RStudio IDE is a powerful and productive user interface for R. It's free and open

R Packages
Our developers and expert trainers are the authors of several popular R packages.

Bring R to the web
Shiny is an elegant and powerful web framework for building interactive reports

Breve histórico

Linguagem R

Ambiente R

Instalação do R e RStudio

Instalação do R

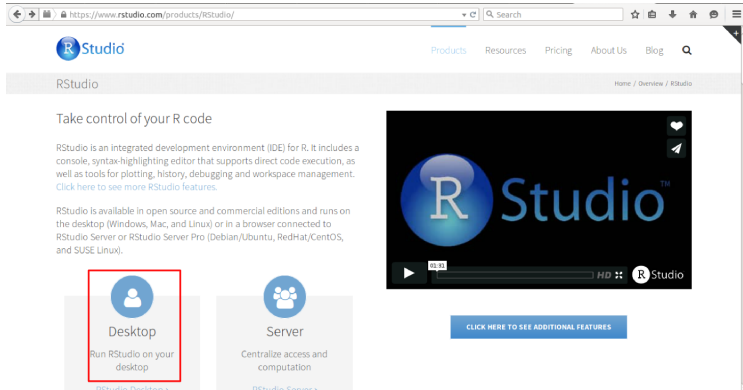
Instalação do RStudio

Recomendações

Instalação do RStudio

Introdução ao R

Cristiane Taniguti
Fernando Correr
Letícia Lara
Marianella
Quezada



https://www.rstudio.com/products/RStudio/

RStudio


Products Resources Pricing About Us Blog

Home / Overview / RStudio

Take control of your R code

RStudio is an integrated development environment (IDE) for R. It includes a console, syntax-highlighting editor that supports direct code execution, as well as tools for plotting, history, debugging and workspace management. [Click here to see more RStudio features.](#)


RStudio is available in open source and commercial editions and runs on the desktop (Windows, Mac, and Linux) or in a browser connected to RStudio Server or RStudio Server Pro (Debian/Ubuntu, RedHat/CentOS, and SUSE Linux).



Desktop

Run RStudio on your desktop


RStudio Desktop



Server

Centralize access and computation

RStudio Server



CLICK HERE TO SEE ADDITIONAL FEATURES

Breve histórico

Linguagem S
Ambiente R

Instalação do R e RStudio

Instalação do R
Instalação do RStudio

Recomendações

Instalação do RStudio

Introdução ao R

Cristiane Taniguti
Fernando Corrêa
Letícia Lara
Marianella
Quezada

https://www.rstudio.com/products/RStudio/#Desktop

RStudio Products Resources Pricing About Us Blog

Overview

- Access RStudio locally
- Syntax highlighting, code completion, and smart indentation
- Execute R code directly from the source editor
- Quickly jump to function definitions
- Easily manage multiple working directories using projects
- Integrated R help and documentation
- Interactive debugger to diagnose and fix errors quickly
- Extensive package development tools

All of the features of open source; plus:

- A commercial license for organizations not able to use AGPL software
- Access to priority support

Support Community forums only

- Priority Email Support
- 8 hour response during business hours (ET)

License AGPL v3 [RStudio License Agreement](#)

Pricing Free \$995/year

[DOWNLOAD RSTUDIO DESKTOP](#) [BUY NOW](#)

Breve histórico

Linguagem S

Ambiente R

Instalação do R e RStudio

Instalação do R

Instalação do RStudio

Recomendações

Instalação do RStudio

Introdução ao R

Cristiane Taniguti
Fernando Correr
Letícia Lara
Marianella
Quezada

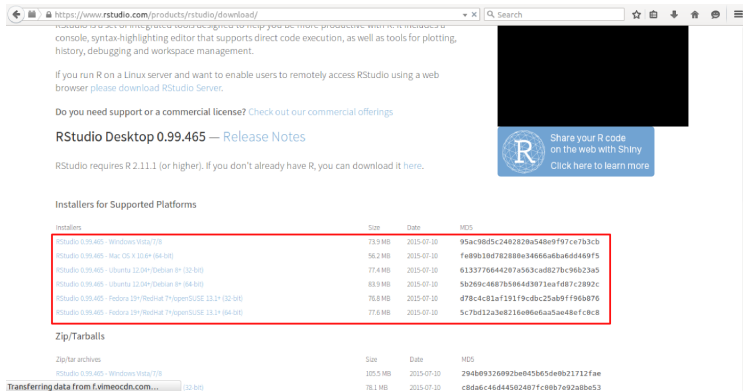
Breve histórico

Linguagem R
Ambiente R

Instalação do R e RStudio

Instalação do R
Instalação do RStudio

Recomendações



The screenshot shows a web browser window displaying the RStudio download page. The URL is <https://www.rstudio.com/products/rstudio/download/>. The page content includes a description of RStudio as a graphical tool for R, a section for Linux server users, and a 'Release Notes' section for RStudio Desktop 0.99.465. A table of installers for supported platforms is visible, with a red box highlighting the Linux and macOS entries. Below the table, there is a section for 'Zip/Tarballs' and a status bar at the bottom indicating data transfer from 'vimeoocdn.com...'. A blue button on the right side of the page says 'Share your R code on the web with Shiny' and 'Click here to learn more'.

https://www.rstudio.com/products/rstudio/download/

RStudio is a set of integrated tools designed to help you be more productive with R. It includes a console, syntax-highlighting editor that supports direct code execution, as well as tools for plotting, history, debugging and workspace management.

If you run R on a Linux server and want to enable users to remotely access RStudio using a web browser [please download RStudio Server](#).

Do you need support or a commercial license? [Check out our commercial offerings](#)

RStudio Desktop 0.99.465 — Release Notes

RStudio requires R 2.11.1 (or higher). If you don't already have R, you can download it [here](#).

Share your R code on the web with Shiny
Click here to learn more

Installers for Supported Platforms

Installers	Size	Date	MD5
RStudio 0.99.465 - Windows Vista/7/8	73.9 MB	2015-07-10	95ac9bd5c2402820a548e9f97ce7b3cb
RStudio 0.99.465 - Mac OS X 10.6+ (64-bit)	56.2 MB	2015-07-10	fe89b10d782880e34666a6b6d4469f5
RStudio 0.99.465 - Ubuntu 12.04+/Debian 8+ (32-bit)	77.4 MB	2015-07-10	6133776644207a563cad827bc96b23a5
RStudio 0.99.465 - Ubuntu 12.04+/Debian 8+ (64-bit)	83.9 MB	2015-07-10	5b269c4687b5064d3071eafd87c2892c
RStudio 0.99.465 - Fedora 19+/RedHat 7+/openSUSE 13.1+ (32-bit)	76.8 MB	2015-07-10	d78c4c91af191f9cdbc25ab9ff96b076
RStudio 0.99.465 - Fedora 19+/RedHat 7+/openSUSE 13.1+ (64-bit)	77.6 MB	2015-07-10	5c7bd12a3e8216e06e6aa5ae48efc8c

Zip/Tarballs

Zip/Tar archives	Size	Date	MD5
RStudio 0.99.465 - Windows Vista/7/8	105.5 MB	2015-07-10	294b09326092be045b65de0b21712fae
Transferring data from vimeoocdn.com...	78.1 MB	2015-07-10	c8da6c4644502407fc80b7e92a8be53

Instalação do RStudio

Introdução ao R

Cristiane Taniguti
Fernando Correr
Letícia Lara
Marianella
Quezada

The screenshot displays the RStudio environment with the following components:

- Source Editor:** Contains a script with the following R code:

```
1 #>
2 cat("Hello", "World!", "\n")
3 getwd()
4 setwd("/home/cristiane/Documents")
5 getwd()
6
7 x<-5
8 y <- 1:20
9 z <- x*y
10
```
- Console:** Shows the execution output and an error message:

```
1:1 (Top Level)
R Script
Console --(Documents) /
error in tools::httpPort <= BL :
comparison (4) is possible only for atomic and list types
> #>
[1] 4
> cat("Hello", "World!", "\n")
Hello World!
> getwd()
[1] "/home/cristiane"
> setwd("/home/cristiane/Documents")
> getwd()
[1] "/home/cristiane/Documents"
>
> x<-5
> y <- 1:20
> z <- x*y
> |
```
- Environment/History:** Shows the current environment with variables:

Values	
x	5
y	int [1:20] 1 2 3 4 5 6 7 8 9 10 ...
z	num [1:20] 5 10 15 20 25 30 35 40 45 50 ...
- Files:** Shows a file explorer view of the current directory, listing files such as presentation_1.out, presentation_1.pdf, presentation_1.snmm, presentation_1.synctex.gz, presentation_1.tex, presentation_1.toc, presentation_1.vrb, presentation_1.zip, presentation_2.zip, presentation_3.zip, and Rascunho.

Breve histórico

Linguagem S
Ambiente R

Instalação do R e
RStudio

Instalação do R
Instalação do RStudio

Recomendações

- *R Programming* ministrado por Roger D. Peng, PhD, Jeff Leek, PhD, Brian Caffo, PhD - **curso online no Coursera**
- pacote "swirl" do R
- <http://www.r-bloggers.com/>