R

An integrated R and Python development environment that controls control of R and Python code, using a console, syntax highlighting editor, an editor that supports direct code execution, and tools for plotting, history, debugging, and workspace management. Connect data scientists and decision makers Publish and distribute data products across your organization. One button expansion for Shiny applications, R markdown reports, Jupyter notebooks, and more. Control and distribute packages Control, organize, and manage the use of R packages to improve repeatability and reduce installation and troubleshooting time. R debuted in 1993 Descar Los Ihaca and Robert Gentleman Developer Development Core Team Key Version 3.6.2[1] (December 12, 2019 (12 months ago) (2019-12-12) S, SchemePlatformu Cross Platform GNU General Public License Website www.r-project.org R It is both a software environment and a programming language for statistical calculations and graphics. It is free software supported by the R Foundation and part of the GNU Bill. [2]R, discovered by Ross Ihaca and Robert Gentleman of the University of Auckland in New Zealand, is now being developed by the R Development Core team. R is similar to the S programming language and can be thought of as an adaptation of S. R, which has become a fact-standard among statisticians in statistical software development, is used in the field of statistical software development and data analysis. [3] R's source code is under the GNU General Public License and is available on different operating systems. R uses a command-line interface, but also has a different graphical user interface. Its characteristics R provide a wide range of statistics (linear and nonlinear modeling, classical statistical testing, time series analysis, classification, clustering and others) and graphic drawing techniques. Like S, R is designed as a programming language that provides users with the opportunity to define new functions and develop additional features. There are some big differences, but the code written for S works exactly with R. Most R systems are written in the same language, which makes it easier for users to follow algorithmic choices. C, C++, and Fortran code can be connected and run at run time for tasks that require intensive calculations. Advanced users can write C code to work with R objects. R can be highly improved with special features added by users and packages in very specific research areas. Due to the legacy of the S language, R has the ability to program objects stronger than many other statistical computing languages. Another strength of R is the possibility of graphs that can draw broadcast-quality graphics with mathematical symbols. R has a wide range of authentications similar to LaTeX and can be used online or for printing purposes. This exampleUse of language basic rules and command lines. A graphic created using the byplot.lm() function. Properties include the use of mathematical notation, where axis labels appear in the lower left. > x <-c(1,2,3,4,5,6)#xランク6s>y <-x^2 #y x Square>Average (y)#yの有アリスメリック平均 [1] 15.16 667 >(y) # Calculate sample variance [1] 178.96 67 > Summary (lm(y-x)) # x-dependent linear regression model with y Call: lm (equation = y to x) Remaining: 1 2 3 4 5 6 3.3333 -0.6667 -2.6667 -0.6667 3.3333 Coefficient: Estimated Std. Error t-value Pr(>|t |) (Intercept) -9.3333 2.8441 -3.282 0.030453 * x 7.0000 0.7303 9.585 0.000662 * --- Signifa. Code: 0 '***' 0.001 '**' 0.01 '**' 0.05 ''0.1' 1 Difference Standard Error: 3.055 4 Degrees of Freedom Multiple R-2 Power: 0.9583, Adjusted R-power: 0.9478 F Statistics: 91.88 on 1 and 4 DF, p-value: 0.000662 > Par (mfrow=c(2, 2)) Plot > (lm(y~x)) # The function of Package R to create diagnostic graphics for regression models is developed in packages added by the user. These packages bring a lot of features to R, including techniques related to a particular specialty, advanced graphics features, and read/write capabilities for many external file formats (SPSS, Matlab, Excel, MySQL connections, etc.). The standard installation of R includes basic packages, but packages below 2000[4] are accessible from a wide R software network (CRAN). Graphical user interface RStudio - a fairly easy and advanced interface to use. RStudio gretl - R gretl package program is an R-Java language independently working R flyer and editor (also known as JGR) rattle GUI - RGtk2-based GUI R commander – tclt K-based GUI rggobi, especially for data mining purposes, the RGobi interface (GGobi interface for matrix visualization RKWard-KDE library-based Sage - Web browser interface also supports RKY Statistics Lab menu menus and GUI). The commercial version R R is available in a variety of commercial and enterprise versions with support and service capabilities. Presented by REvolution Computing, it was archived on the Wayback Machine site on February 11, 2010. ParallelR[5] R+ provided by XL solution with parallel computing function. S-PLUS is similar to RStat R and is a commercial version of S. See also Panda Bibib ^ Archive Copy. Archived on January 23, 2019 from source. Viewed January 19, 2020. ^Robert Gentleman Homepage.Archived from source on June 23, 2006. Viewed February 12, 2010. ^ R I used the statistical computing environment to educate the social statistics subjects of social science education statistics at the university and archived them on the Wayback Machine on June 11, 2016. Henrik Benckson, Milestone: 2000 Package^ Basun Achukramas, Intel Capital Invests Series in REvolution Computing[1] Dush Barantchula Viktapta Bu Konu Hakunda Daha Fazla Birgi Wahl: R Project 5 Mart 2011 Talihinde Wayback Machine Site ininde arşivlendi for R Programming Wikimedia Commons Ta GNU R Ilgiri Alterm Dosiral Burmaktadal Statistical Computing. (Tasal Ana Seifasi) Karrie de R (DMOZ Tabanli) RSeek ve R Site Search R ile Il Ilgiri Itcheri Ezel Alama Motrari.Mufte Riff R Meristeriali Kranuturara Sol Solma Veya Yanutrama Imkanu Sunuyol R Deljsi Hem Kranuturarun Hem Gerishtilisilellirin Ilzhnini Chekebilekek Krulka Inselenen Ve Ististic Hesaprama Ve Geristil Il Ilgiri Delgi.Istatistiki Yazrum Delzisi (Statistical Software Journal) R Kranumuila Ilgiri Chok Saiuda Makarmekte R Kitaprali 29 Nisan 2011 arşivlendi.Il Ilgiri Birsok Kitap Bashiru (Kusa Yormurarilira) Isermekte. R graphical manual tüm R Paquetradeki Graffiti Cütefhanelere Birrikte Tum R Paquetralindeki Tum Vonksillon Ville Ristezini Isemektedir. RWigwy R. Isin Bir Topurk Vixdir R Blogger - R Blog Larundan Delenmish McAleller. Wessa.net R Framework Statistics and Forecast Econometrier Yeni Bachlayanla Isin Kusa Bill R. Krulavs ^ programlama_dili)&oldid=2 4298848sayfasından alınmıştır Language and Environmental Statistics Computing and Graphics RR Terminal Paradigm Multi-Paradigm: Array, Object Oriented, Imperative, Functional, Procedural, Reflective Ross Ihaca and Robert Gentleman Developer R Core Team[1] first appeared in August 1993. 27 years ago (1993-08)[2] Stable Release 4.0.3[3]/10 October 2020; 2 months ago (October 10, 2020) Wikibooks R, wikibooks R's programming language and free software environment [7] The programming language and free software environment of the common Lisp S scheme[2] the extensions.r.rdata.rds.rdaWebsitew.r-project.orgR language of XLispStat-affected file names is widely used among statisticians and data miners for the development and data analysis of statistical software. Studies of polls, data mining surveys and academic literature databases have shown a significant increase in popularity. [9] As of September 2020, R ranked ninth in the TIOBE Index, a measure of the popularity of programming languages. The GNU package[11] official R software environment is written primarily on C, Fort Run, and R itself[12] (and is therefore partially self-hosted) and is freely available under the GNU General Public License. Precompiled executables are provided for various operating systems. R has a command-line interface, but several third-party graphical user interfaces, such as RStudio, the integrated development environment, and the notebook interface Jupyter. [13] [14] History R is an implementation of S.It combines language with the semantics of a vocabulary scope inspired by the scheme. The S was made at Bell Labs by John Chambers in 1976 [the commercial version of S was offered as S-PLUS from 1988.] Much of the code written for S-PLUS is R. Running unchanged in [16] and in 1991, at The University of Auckland with Ross Ihaca and Robert Gentleman[17] we started an alternative implementation of the basic S language, which is completely independent of S-PLUS. They have published this project since 1993. In 1995, Martin Mekler persuaded Ihaca and the gentleman to create R-free, open source software under the GNU General Public License. The R Development Core Team was created to manage the further development of R. John Chambers as of at least August 2018 [update]. R is part of the first two R writers' first names, and part S. As a play named [20], the first official release came in 1995. The Comprehensive R Archive Network (CRAN) was officially announced on April 23, 1997 with three mirrors and 12 contribution packages. The first official version of Stable Beta (v1.0) was released on February 29, 2000. [22] [23] Statistical function R and its libraries implement a variety of statistical and graphical techniques, including linear and nonlinear modeling, classical statistical testing, time series analysis, classification, clustering, and more. R is easily extable through functions and extensions, and the R community is noted for its positive contribution in terms of packaging. Many of R's standard functions are written in R itself [citation required], which makes it easier for the user to follow the choice of algorithm. For computationally expensive tasks, you can link C, C++, and Fortran code to call them at run time. Advanced users can write C, C++, [25] Java, [26] .NET[27] or Python code to work directly with R objects. [28] R is highly extable with user-submitted packages for a specific feature or specific area of study. Because of its S legacy, R has more powerful object-oriented programming capabilities than most statistical computing languages. Citation required The R extension is also relaxed by its syntax scope rules. Another strength of R is its static graphics, which can generate publication quality graphs containing mathematical symbols. Dynamic and interactive graphics are available through additional packages. [30] R has Rd, which is its own LaTeX-like document format used to provide comprehensive documents, both online and in format and hard copy. Users usually access it through command-line interpreters. When the user presses 2+2 at the R command prompt and press enter, the computer responds with 4: > 2 + 2 [1] 4 This calculation is interpreted as the sum of two single element vectors, resulting in a single element vector. Prefix [1] indicates that the list of elements following the same line begins with the first elementLike other similar languages such as APL and MATLAB, R supports matrix arithmetic(a feature that is useful when the output extends over multiple lines). R's data structure includes vectors, matrices, arrays, data frames (similar to tables in relational databases) and lists. Arrays are stored in column measure order. [33] R's extable object system includes objects with (in particular) regression models, time series coordinates, and geospatial coordinates. Instead of the Scolour data type not being an R.[34] data structure, the scolour is represented as a vector of length 1. [35] Many features of R derive from schemes. R uses expression S to represent both data and code. The Citation Required function is top-notch, can be manipulated in the same way as data objects, facilitates metaprogramming, and allows multiple dispatches. Variables in R are syntactically scoped and dynamically typed. Function arguments are passed by value and are delayed. [36] R supports procedural programming with functions, and some support object-oriented programming with generic functions. Generic functions behave differently depending on the class of arguments passed. In other words, a generic function dispatches a function (method) that is specific to the object's class. For example, R has a generic print function that can print almost any class of objects in R using a simple print(objectname) syntax. Primarily used by statisticians and other practitioners who need an environment for statistical calculations and software development, R can also operate as a general matrix calculation toolbox using performance benchmarks comparable to GNU Octave and MATLAB. [38] Package Main Article: The functionality of R Package R is extended through user-created packages, using user-created packages, allowing specialized statistical techniques, graphical devices, import/export capabilities, and reporting tools such as Rmarkdown, knitting, and sweet. These packages are primarily developed in R and, in some cases, in Java, C, C++, and Fortran. Citation required The R packaging system is also used by researchers to create conferences to organize research data, code and report files in a systematic way for sharing and public archiving. The R installation includes a core set of packages and includes more than 15,000 additional packages (as of September 2018 [update]) available on the comprehensive R Archive Network (GRAN), [40] Bio conductor, Omega Hat, [41] GitHub, and other repositories. [42] The Task View (subject list) on the CERAN website lists a wide range of tasks for which R applies and which packages are available,such as finance, genetics, high-performance computing, machine learning, medical imaging, social science, and spatial statistics. R has also been identified by the FDA as suitable for interpreting data from clinical studies. [44] Other R package resources include:A community site for evaluating and reviewing all CRAN packages, R-Forge is the central platform for joint development of [46] R-packages, R-related software, and projects. R-Forge also hosts development versions of many previously announced beta and CRAN packages. Microsoft maintains daily snapshots of THE GRAN dating back to September 17, 2014. The Biocondector Project will provide an R package for the analysis of genomic data. This includes object-oriented data processing and analysis tools for data from Affymetrix, cDNA microarrays, and next-generation high-throughput sequencing methods. A group of packages called Tydyverse, considered R-language languages, are becoming increasingly popular in the R ecosystem. Note 1 The group of packages strives to provide a consistent collection of functions to address common data science tasks, including importing, cleaning, transforming, and visualizing data, especially ggplot2 packages. R is one of five languages with apache spark APIs, the others are Scala, Java, Python, and SQL. [49] [50] The list of milestone R release changes is stored in various news files in CERAN. [51] Highlights of several major releases are shown below. Release date description 0.16 This is the last alpha version developed mainly by Ihaca and gentlemen. Many of the basic features of the White Book (see History of S) have been implemented. The mailing list began on April 1, 1997. 0.49 1997-04-23 This is the oldest source release currently available in GRAN. [52] THE GRAN starts on this day and initially has three mirrors that host 12 packages. [53] The alpha version of Microsoft's R for Windows and the legacy Mac OS will be available immediately after this version. Citation required 0.60 1997-12-05 R will be the official part of the GNU project. The code is hosted and maintained in CVS. 0.65.1 The first version of the update.packages and install.packages functions for downloading and installing packages from 1999-10-07 GRAN. [54] 1.0 2000-02-29 Consider its developers to be stable enough for production. [55] The 1.4 2001-12-19 S4 method has been introduced and the first version of Mac OS X will be available immediately. 1.8 2003-10-08 We have introduced a flexible condition handling mechanism for signaling and processing condition objects. 2.0 2004-10-04 Introduced lazy loading that enables fast loading of data at the lowest cost of system memory. 2.1 Support for 2005-04-18 UTF-8 encoding, and the beginning of internationalization and localization of different languages. 2.6.2 2008-02-08 Windows 95, 98, Me and NT 4.0[56]2.11 2010-04-22 The last version to support support for Windows 64-bit systems. 2.12.2 2011-02-25 Windows 2000[57] 2.13 Added a required namespace for the last version .2.14 2011-10-31 package that added a new compiler function that can speed up functions by converting them to 2011-04-14 bytecode. Added a new parallel package. 2.15 2012-03-30 New load balancing feature.The serialization rate of a long vector. 3.0.0 2013-04-03 Support for numeric index values of 231 or higher on 64-bit systems. 3.3.3 2017-03-06 The last version to support Microsoft Windows XP. 3.4.0 2017-04-21 Just-in-time compilation (JIT) of functions and loops to bytecode enabled by default. 3.5.0 2018-04-23 Packages compiled by bytes during installation by default. A compact internal representation of integer sequences. A new serialization format has been added to support compact internal representations. 3.6.0 2019-04-26 Improved sampling from discrete uniform distributions that were noticeably uneven in large populations[58].3.5.0 and later supported new serialization formats are the default. 4.0.0 2020-04-24 R now uses the default string AsFactors = FALSE, so by default it no longer converts strings to data.frame() and read.table() call factors. Reference counts are used to track object sharing, reducing the need to copy objects. The new syntax for raw string constants. There are a variety of applications that you can use to edit and run interface R code. [59] Users prefer to run R through the command line console, but they can also run it using the [60] IDE. R IDs include Rattle GUI, R Commander, RKWard, RStudio, and Tinn-R (in alphabetical order). [60] R is also supported by versatile IDEs such as Eclipse with the StatET plug-in [61], and also in Visual Studio using R tools for Visual Studio. [62] Editors who support R include Emacs, Vim (Nvim-R plugin[63]), Kate, [64] LyX, [65] Notepad++, [66] Visual Studio Code, WinEdt, [67] and Tinn-R. [68] Jupyter notebooks can also be configured to edit and run R code. [69] R features can be accessed from scripting languages such as Python, [70] Perl, [71] Ruby, F#, [73] and Julia. [74] Interfaces to other high-level programming languages such as Java[75] and .NET C#[76][77] are also available. The main R implementations are written in R, C, and Fortran, and [78] there are some implementations designed to improve speed and scalability. A closely related implementation is pqR (fairly quick R) by Radford M. Neal with improved memory management and automatic multithreading support. Renzine and FastR are Java implementations of R for use with Java virtual machines. CXXR, rho, and riposte[79] are implementations of R in C++. Renzine, Riposte, and pqR use multiple processor cores and some kind of delay evaluation to try to improve performance. Most of these alternative implementations are experimental and incomplete, with relatively few users compared to the main implementations managed by the R development core team. TIBCO built a runtime engine called TERR, which is part spotfire. [81] Microsoft R Open is a fully compatible R distribution that modifies multithreaded calculations. Community R has communities around the world where users can use the network, share ideas and learn. [83] [84] Increasing number of R eventsMeetings (e.g. useR!, WhyR?, Cornctor R, Satle Days)[85][86]meetups, and R-Ries group[88] promoting gender diversity, R Foundation Task Force on Women and Other Under-Representation Groups, etc. [89] The official annual meeting of useR! conference R users is called useR!. [90] The first event was useR!, Vienna, Austria, May 2004. [91] After skipping

2005, the useR! conference is held annually, usually alternating locations in Europe and North America. [92] Subsequent meetings include: [90]useR!2006, Vienna, Austria useR!2007, Ames, Iowa, USA useR!2 008, Dortmund, Germany useR!2009, Rennes, France useR!2010, Gethersburg, Maryland, USA useR!2011, Coventry, British User!2012, Nashville, Tennessee, USA useR!2013, Albacete, Spain useR!2014, Los Angeles, California, USA useR!2015, Aorborg, Danish useR!2016, Stanford, California, USA useR!2017, Brussels, Belgium Youth R! In 2018, Brisbane, Australia useR!2019, Toulouse, France useR!2020, St. Louis, Missouri, USA (held online due to the COVID-19 pandemic) Future conferences include: [90] [93]useR!2021, Zurich, Swiss R Journal R Journal is an open access, referee journal of the R Project for Statistical Computing. It features short to medium articles on the use and development of R, including packages, programming tips, CRAN news, and basic news. Comparisons with SAS, SPSS, and Stta R are equivalent to popular commercial statistics packages such as SAS, SPSS, and Stuta, but are available for free under a free software license. In January 2009, The New York Times published an article showing R's growth, the reasons for the popularity of data scientists, and threats to commercial statistical packages such as SAS. In June 2017, data scientist Robert Munich published a more detailed comparison between R and other software packages, The Popularity of Data Science Software. [96] R is more procedural and code-oriented than SAS or SPSS, both of which use a lot of pre-programmed procedures (called procs) that are built into the language environment and customized by the parameters of each call. R generally processes data in memory, but it limits its useful capabilities for processing very large files. R's Commercial Support R is an open source project supported by the community that develops it, but some companies strive to provide commercial support and extensions to their customers. This section provides some examples of such companies. In 2007, Richard Schultz, Martin Schulz, Steve Weston and Kirk Mettler founded Revolution Analytics to provide commercial support for Revolution R, the distribution of R, which includes components developed by the company. Key additional components include ParallelR, R Productivity Environment IDE, RevoScaleR (for big data analysis), RevoDeployR, Web services framework, and features.Reading and writing data in sas file format. Revolution Analysis also provides the distribution of R designed to comply with established IQ/OQ/PQ standards that allow pharmaceutical industry clients to verify the installation of REvolution R.[99]. [100] Since then, it has integrated the R programming language into SQL Server 2016, SQL Server 2017, Power BI, Azure SQL Database, Azure Cortana Intelligence, Microsoft R Server, and Visual Studio 2017. In October 2011, Oracle announced a big data appliance that integrates R, Apache Hadoop, Oracle Linux, and NoSQL databases with Exadata hardware. [102] As of 2012[Update], Oracle R Enterprise[103] became one of two components of the Oracle Advanced Analysis Option (alongside Oracle data mining). Citation required IBM supports running R,[105] on Hadoop, provides a large parallel in-database analysis programming model in R.[106] Tibco, and provides runtime version R as part of spotfire. Mango Solutions offers R, ValidR, and [108][109] verification packages to comply with drug approval agencies such as the FDA. These agencies allow the use of any statistical software in submissions if only the software is verified by the vendor or sponsor itself. [110] Example of basic syntax The following example shows the use of the basic syntax of the language and the command-line interface. (An extended list of standard language features can be finded in the R manual R Overview (111). In R, the generally recommended id operator is an arrow created from a two-letter <. [112] [113] > x < - 1:6# In the current environment, create a vector based on the value that outputs the contents of the y <- x^2 # x. > print(y) # vector >create a numeric vector. [1] 1 4 9 16 25 36 > z < - Create a new vector representing the sum of x + y # x and y > z # Returns z content to the current environment. [1] 2 6 12 20 30 42 > z_matrix <-Matrix(z, nrow=3) # Vector z 3x2 Matrix Object > create a new matrix to convert to z_matrix 3x2 matrix objects > z_matrix [,1] [,2] 20 [2,] 6 30 [3,] 12 42 > 2*t(z_matrix)-2# Returns the results to the result of the calculation, two at a time. [,1] [,2] [,3] [1,] 2 10 22 [2,] 38 58 82 > new_df <-data.frame(t(z_matrix), row.names=c('A','B')) # Transsed z_matrix new_df Create a new data.frame object that contains data from the file, row names 'A' and 'B' > first names (new_df <) c('X','Y','Z') # #new_df column names X, Y, Z. > print (new_df) #print現在の結果に設定します. X Y Z A 2 6 12 B 20 30 42 > new_df$Z #output Z column [1] 12 42 > new_df$Z==new_df[Z'] > new_df[3]=new_df$Z # data.frame column Z can be accessed using the $Z, 'Z', or [3] syntax, and the value is the same. [1] TRUE > Attribute (new_df) #print属性情報new_df$names [1] X Y Z $row.names [1] A B $class [1] data.frame > Attribute (new_df) $row.names <- c('one','two') ## Access and change the row.names attribute. Also, one of the strengths of line name ()> new_df X Y Z one 2 6 12 22 22 20 30 42 function structure R is the ease of creating new functions. The object in the function body remains local to the function and may return any data type. [114] Here is an example of a user-created function: # x, declaring a function f < that returns a linear combination of y # x and y. y) { z < 3 * x + 4 * y return(z) ## return() function is optional > f(1, 2) [1] 11 > f(c,2,3), c(5,3,4)) [1] 23 18 25 > f(1:3, 4) [1] 19 22 25 Modeling and plot R languages support modeling. The following example shows how to easily generate and plot a linear model with R with remains. > x < - 1:6 # y <- x^2 > Create values for models > x and y < - lm-lm(y to x) # Linear regression model y = A + B * x. > Summary (model) # Provides a detailed overview of the model. Call: lm (expression = y to x) Remaining: 1 2 3 4 5 3.3333 -0.6667 -2.6667 -0.6667 3.3333 Coefficient: Estimated Std. Error t Value Pr(>|||t|) (Intercept) -9.3333 2.8441 -3.282 0.030453 * x 7.0000 0.7303 9.585 0.000662 * ---Signiff.Code: 0 '***' 0.001 '**' 01 '*' 0.05 ''0.1' 1 Residual Standard Error: 3.055 4 Degrees of Freedom Multiple R-2 Power: 0.9583, Adjustment R-Power: 0.9478 F Statistics: 91.88 on 1 and 4 DF, p-value: 0.000662 > Par (mfrow = c(2,2)) # 2 is laid out as 2. > Plot (model) #モデルの出力診断プロット. Mandelbrot set a short R code to calculate the first 20 repetitions of the formula z = z2 + c and plotted it to a different complex constant c. This example uses a community-developed external library (called a package), in this case as the basic data type for a multidimensional array of complex numbers in caTools package processing, variables C, Z, X.install.packages (caTools) #外部パッケージライブラリをインストールする (caTools) #外部パッケージをインストールする書き込み.gif function jet.colors <-colorRamp Palette(c(Red, Blue, #007FFF, Cyan, #7FFF7F, #7FFF7F, Yellow, #FF7F00, Red, #7F0000)) dx <- Define 1500 # Width dy <- 1400 # Height C < - Complex Number (Real Number = rep(seq(-2.2,1.0,length.out =dx), image= image=seq(-1.2, 1.2, Length 1.out =dy), dx) C) <- Matrix (C, dy, dx) # Complex number Z < - 0 # Initialize z to zero X array z <Zero X array (0, c(dy, dx, 20)) # Output 3D array (k in 1:20) { # Loop 20 iterations Z < - Z^2 + C # Middle formula X[, , k] <- exp(-abs(Z)) # capture results } write.gif(X, Mandelbrot.gif, col = jet.colors, delay = 100) comparison of numerical analysis software Comparison of numerical analysis software Statistical software numerical analysis software listAs of RStudio Statcheck Tidyverse Notes ^ 2020-06-13, Metacran has listed 7 of Tidyverse's 8 core packages in its list of most download R packages. Resources ^ Hornick, Kurt (November 26, 2015). R FAQ.Comprehensive R archive network. What is 2.1 R? acquired on August 5, 2018. ^ a b Ihaca, Ross (1998). R: History of the past and future (PDF) (technical report). Department of Statistics^ R 4.0.3, Auckland University of New Zealand released; string of author names: Peter Dalgard; Published: October 10, 2020 Acquisition: 10 October 2020.^ R license. r-project. Acquired on August 5, 2018. ^ Introduction. Julia Manual. Archived from the original on June 20, 2018. Acquired on August 5, 2018. ^ R Language and Environment Hornick, Kurt (October 4, 2017). R FAQ.Comprehensive R archive network. What is 2.1 R? acquired on August 6, 2018. R Foundation Hornick, Kurt (October 4, 2017). R FAQ.Comprehensive R archive network. 2.13 What is the R Foundation? acquired on August 6, 2018. The R core team asks authors who use R for data analysis to cite software using the R core team (2016). R: Language and environment for statistical calculations. 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