

The Lisp-Stat Reference Manual

Statistical Computing in Common Lisp, version 1.0.0

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Table of Contents

| | |
|---------------------------------------|-----------|
| Copying | 1 |
| 1 Systems | 3 |
| 1.1 lisp-stat | 3 |
| 2 Modules | 5 |
| 2.1 lisp-stat/base | 5 |
| 2.2 lisp-stat/statistics | 5 |
| 2.3 lisp-stat/docs | 5 |
| 3 Files | 7 |
| 3.1 Lisp | 7 |
| 3.1.1 lisp-stat/lisp-stat.asd | 7 |
| 3.1.2 lisp-stat/pkgdcls.lisp | 7 |
| 3.1.3 lisp-stat/base/variables.lisp | 7 |
| 3.1.4 lisp-stat/base/data.lisp | 7 |
| 3.1.5 lisp-stat/base/rdata.lisp | 8 |
| 3.1.6 lisp-stat/statistics/stats.lisp | 10 |
| 3.1.7 lisp-stat/docs/doc-strings.lisp | 10 |
| 3.1.8 lisp-stat/ls-init.lisp | 10 |
| 3.2 Static | 11 |
| 3.2.1 lisp-stat/license | 11 |
| 4 Packages | 13 |
| 4.1 lisp-stat | 13 |
| 4.2 ls-user | 13 |
| 4.3 rdata | 14 |
| 5 Definitions | 17 |
| 5.1 Public Interface | 17 |
| 5.1.1 Special variables | 17 |
| 5.1.2 Macros | 27 |
| 5.1.3 Ordinary functions | 27 |
| 5.2 Internals | 29 |
| 5.2.1 Special variables | 29 |
| 5.2.2 Ordinary functions | 32 |
| 5.2.3 Generic functions | 32 |
| Appendix A Indexes | 33 |
| A.1 Concepts | 33 |
| A.2 Functions | 34 |
| A.3 Variables | 35 |
| A.4 Data types | 36 |

Copying

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1 Systems

The main system appears first, followed by any subsystem dependency.

1.1 lisp-stat

A statistical computing environment for Common Lisp

Long Name

Statistical Computing in Common Lisp

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Home Page

<https://lisp-stat.dev/>

Source Control

(GIT <https://github.com/Lisp-Stat/lisp-stat.git>)

Bug Tracker

<https://github.com/Lisp-Stat/lisp-stat/issues>

License MS-PL

Long Description

The Lisp-Stat system is an umbrella for a few projects and provides a unified interface for working with statistics. The general rule is that Lisp-Stat may depend on other libraries, for example data-frame, but not the other way around. Lisp-Stat provides it's own user package, LS-USER, which imports CL as well as the symbols we need from the other libraries. You should always do your work in the LS-USER package, and not in CL-USER.

Version 1.0.0

Dependencies

- alexandria (system).
- let-plus (system).
- array-operations (system).
- data-frame (system).
- dfio (system).
- num-utils (system).
- select (system).
- dexador (system).
- split-sequence (system).

Source [lisp-stat.asd], page 7.

Child Components

- [pkgdcls.lisp], page 7 (file).
- [license], page 11 (file).
- [base], page 5 (module).
- [statistics], page 5 (module).
- [docs], page 5 (module).
- [ls-init.lisp], page 10 (file).

2 Modules

Modules are listed depth-first from the system components tree.

2.1 lisp-stat/base

Source [lisp-stat.asd], page 7.

Parent Component
 [lisp-stat], page 3 (system).

Child Components

- [variables.lisp], page 7 (file).
- [data.lisp], page 7 (file).
- [rdata.lisp], page 8 (file).

2.2 lisp-stat/statistics

Source [lisp-stat.asd], page 7.

Parent Component
 [lisp-stat], page 3 (system).

Child Component
 [stats.lisp], page 10 (file).

2.3 lisp-stat/docs

Source [lisp-stat.asd], page 7.

Parent Component
 [lisp-stat], page 3 (system).

Child Component
 [doc-strings.lisp], page 10 (file).

3 Files

Files are sorted by type and then listed depth-first from the systems components trees.

3.1 Lisp

3.1.1 `lisp-stat/lisp-stat.asd`

Source `[lisp-stat.asd]`, page 7.

Parent Component
`[lisp-stat]`, page 3 (system).

ASDF Systems
`[lisp-stat]`, page 3.

3.1.2 `lisp-stat/pkgdcls.lisp`

Source `[lisp-stat.asd]`, page 7.

Parent Component
`[lisp-stat]`, page 3 (system).

Packages `[lisp-stat]`, page 13.

3.1.3 `lisp-stat/base/variables.lisp`

Source `[lisp-stat.asd]`, page 7.

Parent Component
`[base]`, page 5 (module).

Public Interface

- `[def]`, page 27 (macro).
- `[savevar]`, page 28 (function).
- `[undef-var]`, page 28 (function).
- `[variables]`, page 28 (function).

Internals

- `[*variables*]`, page 29 (special variable).
- `[save-obj]`, page 32 (generic function).

3.1.4 `lisp-stat/base/data.lisp`

Dependency
`[variables.lisp]`, page 7 (file).

Source `[lisp-stat.asd]`, page 7.

Parent Component
`[base]`, page 5 (module).

Public Interface
`[data]`, page 27 (function).

3.1.5 lisp-stat/base/rdata.lisp

Dependency

[data.lisp], page 7 (file).

Source

[lisp-stat.asd], page 7.

Parent Component

[base], page 5 (module).

Packages

[rdata], page 14.

Public Interface

- [`*r-default-datasets*`], page 17 (special variable).
- [`ability.cov`], page 17 (special variable).
- [`airmiles`], page 17 (special variable).
- [`airpassengers`], page 17 (special variable).
- [`airquality`], page 17 (special variable).
- [`anscombe`], page 17 (special variable).
- [`attenu`], page 17 (special variable).
- [`attitude`], page 17 (special variable).
- [`austres`], page 18 (special variable).
- [`base-url`], page 18 (special variable).
- [`bjsales`], page 18 (special variable).
- [`bod`], page 18 (special variable).
- [`cars`], page 18 (special variable).
- [`chickweight`], page 18 (special variable).
- [`chickwts`], page 18 (special variable).
- [`co2-1`], page 18 (special variable).
- [`co2-2`], page 18 (special variable).
- [`crimtab`], page 19 (special variable).
- [`discoveries`], page 19 (special variable).
- [`dnase`], page 19 (special variable).
- [`esoph`], page 19 (special variable).
- [`euro`], page 19 (special variable).
- [`eustockmarkets`], page 19 (special variable).
- [`faithful`], page 19 (special variable).
- [`formaldehyde`], page 19 (special variable).
- [`freeny`], page 19 (special variable).
- [`haireyecolor`], page 20 (special variable).
- [`harman23.cor`], page 20 (special variable).
- [`harman74.cor`], page 20 (special variable).
- [`index`], page 20 (special variable).
- [`indometh`], page 20 (special variable).
- [`infert`], page 20 (special variable).
- [`insectsprays`], page 20 (special variable).
- [`iris`], page 20 (special variable).

- `[iris3]`, page 20 (special variable).
- `[islands]`, page 20 (special variable).
- `[johnsonjohnson]`, page 21 (special variable).
- `[lakehuron]`, page 21 (special variable).
- `[lh]`, page 21 (special variable).
- `[lifecyclesavings]`, page 21 (special variable).
- `[load-r-default-datasets]`, page 28 (function).
- `[load-r-metadata]`, page 28 (function).
- `[loblolly]`, page 21 (special variable).
- `[longley]`, page 21 (special variable).
- `[lynx]`, page 21 (special variable).
- `[morley]`, page 21 (special variable).
- `[mpg]`, page 21 (special variable).
- `[mtcars]`, page 22 (special variable).
- `[nhtemp]`, page 22 (special variable).
- `[nile]`, page 22 (special variable).
- `[nottem]`, page 22 (special variable).
- `[npk]`, page 22 (special variable).
- `[nycflights13-airlines]`, page 22 (special variable).
- `[nycflights13-airports]`, page 22 (special variable).
- `[nycflights13-flights]`, page 22 (special variable).
- `[nycflights13-planes]`, page 22 (special variable).
- `[nycflights13-weather]`, page 23 (special variable).
- `[occupationalstatus]`, page 23 (special variable).
- `[orange]`, page 23 (special variable).
- `[orchardsprays]`, page 23 (special variable).
- `[plantgrowth]`, page 23 (special variable).
- `[precip]`, page 23 (special variable).
- `[presidents]`, page 23 (special variable).
- `[pressure]`, page 23 (special variable).
- `[puromycin]`, page 23 (special variable).
- `[quakes]`, page 24 (special variable).
- `[randu]`, page 24 (special variable).
- `[rivers]`, page 24 (special variable).
- `[rock]`, page 24 (special variable).
- `[save-r-data]`, page 28 (function).
- `[save-r-default-datasets]`, page 28 (function).
- `[seatbelts]`, page 24 (special variable).
- `[stackloss]`, page 24 (special variable).
- `[sunspot.month]`, page 24 (special variable).
- `[sunspot.year]`, page 24 (special variable).
- `[sunspots]`, page 24 (special variable).
- `[swiss]`, page 25 (special variable).

- [theoph], page 25 (special variable).
- [titanic], page 25 (special variable).
- [toothgrowth], page 25 (special variable).
- [treering], page 25 (special variable).
- [trees], page 25 (special variable).
- [ucbadmissions], page 25 (special variable).
- [ukdriverdeaths], page 25 (special variable).
- [ukgas], page 25 (special variable).
- [usaccdeaths], page 26 (special variable).
- [usarrests], page 26 (special variable).
- [usjudgeratings], page 26 (special variable).
- [uspersonalexpenditure], page 26 (special variable).
- [uspop], page 26 (special variable).
- [vadeaths], page 26 (special variable).
- [volcano], page 26 (special variable).
- [warpbreaks], page 26 (special variable).
- [women], page 26 (special variable).
- [worldphones], page 27 (special variable).
- [wwwusage], page 27 (special variable).

Internals

- [*r-default-dataframes*], page 29 (special variable).
- [student-sleep], page 30 (special variable).

3.1.6 lisp-stat/statistics/stats.lisp

Source [lisp-stat.asd], page 7.

Parent Component

[statistics], page 5 (module).

Public Interface

- [fivenum], page 27 (function).
- [interquartile-range], page 28 (function).

3.1.7 lisp-stat/docs/doc-strings.lisp

Source [lisp-stat.asd], page 7.

Parent Component

[docs], page 5 (module).

3.1.8 lisp-stat/ls-init.lisp

Source [lisp-stat.asd], page 7.

Parent Component

[lisp-stat], page 3 (system).

Packages [ls-user], page 13.

Internals [setup-ls-translations], page 32 (function).

3.2 Static

3.2.1 `lisp-stat/license`

Source `[lisp-stat.asd]`, page 7.

Parent Component
 `[lisp-stat]`, page 3 (system).

4 Packages

Packages are listed by definition order.

4.1 `lisp-stat`

Base functions for Lisp-Stat

Source `[pkgdcls.lisp]`, page 7.

Nickname `ls`

Use List

- `alexandria`.
- `array-operations/all`.
- `common-lisp`.
- `data-frame`.
- `dfio`.
- `num-utils.arithmetic`.
- `num-utils.elementwise`.
- `num-utils.print-matrix`.
- `num-utils.statistics`.
- `num-utils.utilities`.
- `select`.
- `split-sequence`.

Used By List

`[ls-user]`, page 13.

Public Interface

- `[data]`, page 27 (function).
- `[def]`, page 27 (macro).
- `[fivenum]`, page 27 (function).
- `[interquartile-range]`, page 28 (function).
- `[savevar]`, page 28 (function).
- `[undef-var]`, page 28 (function).
- `[variables]`, page 28 (function).

Internals

- `[*variables*]`, page 29 (special variable).
- `[save-obj]`, page 32 (generic function).
- `[setup-ls-translations]`, page 32 (function).

4.2 `ls-user`

User package for Lisp-Stat

Source `[ls-init.lisp]`, page 10.

Use List

- `common-lisp`.
- `[lisp-stat]`, page 13.

Internals

- [iris], page 29 (special variable).
- [mtcars], page 29 (special variable).
- [plant-growth], page 30 (special variable).
- [tooth-growth], page 30 (special variable).
- [usarrests], page 31 (special variable).

4.3 rdata

Source [rdata.lisp], page 8.

Use List common-lisp.

Public Interface

- [*r-default-datasets*], page 17 (special variable).
- [ability.cov], page 17 (special variable).
- [airmiles], page 17 (special variable).
- [airpassengers], page 17 (special variable).
- [airquality], page 17 (special variable).
- [anscombe], page 17 (special variable).
- [attenu], page 17 (special variable).
- [attitude], page 17 (special variable).
- [austres], page 18 (special variable).
- [base-url], page 18 (special variable).
- [bjsales], page 18 (special variable).
- [bod], page 18 (special variable).
- [cars], page 18 (special variable).
- [chickweight], page 18 (special variable).
- [chickwts], page 18 (special variable).
- [co2-1], page 18 (special variable).
- [co2-2], page 18 (special variable).
- [crimtab], page 19 (special variable).
- [discoveries], page 19 (special variable).
- [dnase], page 19 (special variable).
- [esoph], page 19 (special variable).
- [euro], page 19 (special variable).
- [eustockmarkets], page 19 (special variable).
- [faithful], page 19 (special variable).
- [formaldehyde], page 19 (special variable).
- [freeny], page 19 (special variable).
- [haireyecolor], page 20 (special variable).
- [harman23.cor], page 20 (special variable).
- [harman74.cor], page 20 (special variable).
- [index], page 20 (special variable).
- [indometh], page 20 (special variable).

- `[infert]`, page 20 (special variable).
- `[insectsprays]`, page 20 (special variable).
- `[iris]`, page 20 (special variable).
- `[iris3]`, page 20 (special variable).
- `[islands]`, page 20 (special variable).
- `[johnsonjohnson]`, page 21 (special variable).
- `[lakehuron]`, page 21 (special variable).
- `[lh]`, page 21 (special variable).
- `[lifecyclesavings]`, page 21 (special variable).
- `[load-r-default-datasets]`, page 28 (function).
- `[load-r-metadata]`, page 28 (function).
- `[loblolly]`, page 21 (special variable).
- `[longley]`, page 21 (special variable).
- `[lynx]`, page 21 (special variable).
- `[morley]`, page 21 (special variable).
- `[mpg]`, page 21 (special variable).
- `[mtcars]`, page 22 (special variable).
- `[nhtemp]`, page 22 (special variable).
- `[nile]`, page 22 (special variable).
- `[nottem]`, page 22 (special variable).
- `[npk]`, page 22 (special variable).
- `[nycflights13-airlines]`, page 22 (special variable).
- `[nycflights13-airports]`, page 22 (special variable).
- `[nycflights13-flights]`, page 22 (special variable).
- `[nycflights13-planes]`, page 22 (special variable).
- `[nycflights13-weather]`, page 23 (special variable).
- `[occupationalstatus]`, page 23 (special variable).
- `[orange]`, page 23 (special variable).
- `[orchardsprays]`, page 23 (special variable).
- `[plantgrowth]`, page 23 (special variable).
- `[precip]`, page 23 (special variable).
- `[presidents]`, page 23 (special variable).
- `[pressure]`, page 23 (special variable).
- `[puromycin]`, page 23 (special variable).
- `[quakes]`, page 24 (special variable).
- `[randu]`, page 24 (special variable).
- `[rivers]`, page 24 (special variable).
- `[rock]`, page 24 (special variable).
- `[save-r-data]`, page 28 (function).
- `[save-r-default-datasets]`, page 28 (function).
- `[seatbelts]`, page 24 (special variable).
- `[stackloss]`, page 24 (special variable).
- `[sunspot.month]`, page 24 (special variable).

- `[sunspot.year]`, page 24 (special variable).
- `[sunspots]`, page 24 (special variable).
- `[swiss]`, page 25 (special variable).
- `[theoph]`, page 25 (special variable).
- `[titanic]`, page 25 (special variable).
- `[toothgrowth]`, page 25 (special variable).
- `[treering]`, page 25 (special variable).
- `[trees]`, page 25 (special variable).
- `[ucbadmissions]`, page 25 (special variable).
- `[ukdriverdeaths]`, page 25 (special variable).
- `[ukgas]`, page 25 (special variable).
- `[usaccdeaths]`, page 26 (special variable).
- `[usarrests]`, page 26 (special variable).
- `[usjudgeratings]`, page 26 (special variable).
- `[uspersonalexpenditure]`, page 26 (special variable).
- `[uspop]`, page 26 (special variable).
- `[vadeaths]`, page 26 (special variable).
- `[volcano]`, page 26 (special variable).
- `[warpbreaks]`, page 26 (special variable).
- `[women]`, page 26 (special variable).
- `[worldphones]`, page 27 (special variable).
- `[wwwusage]`, page 27 (special variable).

Internals

- `[*r-default-dataframes*]`, page 29 (special variable).
- `[student-sleep]`, page 30 (special variable).

5 Definitions

Definitions are sorted by export status, category, package, and then by lexicographic order.

5.1 Public Interface

5.1.1 Special variables

| | |
|---|-----------------------|
| *r-default-datasets* | [Special Variable] |
| All data sets included by default in R | |
| Package | [rdata], page 14. |
| Source | [rdata.lisp], page 8. |
| ability.cov | [Special Variable] |
| Ability and Intelligence Tests | |
| Package | [rdata], page 14. |
| Source | [rdata.lisp], page 8. |
| airmiles | [Special Variable] |
| Passenger Miles on Commercial US Airlines, 1937-1960 | |
| Package | [rdata], page 14. |
| Source | [rdata.lisp], page 8. |
| airpassengers | [Special Variable] |
| Monthly Airline Passenger Numbers 1949-1960 | |
| Package | [rdata], page 14. |
| Source | [rdata.lisp], page 8. |
| airquality | [Special Variable] |
| New York Air Quality Measurements | |
| Package | [rdata], page 14. |
| Source | [rdata.lisp], page 8. |
| anscombe | [Special Variable] |
| Anscombe's Quartet of 'Identical' Simple Linear Regressions | |
| Package | [rdata], page 14. |
| Source | [rdata.lisp], page 8. |
| attenu | [Special Variable] |
| The Joyner-Boore Attenuation Data | |
| Package | [rdata], page 14. |
| Source | [rdata.lisp], page 8. |
| attitude | [Special Variable] |
| The Chatterjee-Price Attitude Data | |
| Package | [rdata], page 14. |
| Source | [rdata.lisp], page 8. |

| | |
|---|--------------------|
| austres | [Special Variable] |
| Quarterly Time Series of the Number of Australian Residents | |
| Package [rdata], page 14. | |
| Source [rdata.lisp], page 8. | |
| base-url | [Special Variable] |
| Base URL for datasets included in R | |
| Package [rdata], page 14. | |
| Source [rdata.lisp], page 8. | |
| bjsales | [Special Variable] |
| Sales Data with Leading Indicator | |
| Package [rdata], page 14. | |
| Source [rdata.lisp], page 8. | |
| bod | [Special Variable] |
| Biochemical Oxygen Demand | |
| Package [rdata], page 14. | |
| Source [rdata.lisp], page 8. | |
| cars | [Special Variable] |
| Speed and Stopping Distances of Cars | |
| Package [rdata], page 14. | |
| Source [rdata.lisp], page 8. | |
| chickweight | [Special Variable] |
| Weight versus age of chicks on different diets | |
| Package [rdata], page 14. | |
| Source [rdata.lisp], page 8. | |
| chickwts | [Special Variable] |
| Chicken Weights by Feed Type | |
| Package [rdata], page 14. | |
| Source [rdata.lisp], page 8. | |
| co2-1 | [Special Variable] |
| Carbon Dioxide Uptake in Grass Plants | |
| Package [rdata], page 14. | |
| Source [rdata.lisp], page 8. | |
| co2-2 | [Special Variable] |
| Mauna Loa Atmospheric CO2 Concentration | |
| Package [rdata], page 14. | |
| Source [rdata.lisp], page 8. | |

| | |
|--|--------------------|
| crimtab Student's 3000 Criminals Data | [Special Variable] |
| Package [rdata], page 14. | |
| Source [rdata.lisp], page 8. | |
| discoveries Yearly Numbers of Important Discoveries | [Special Variable] |
| Package [rdata], page 14. | |
| Source [rdata.lisp], page 8. | |
| dnase Elisa assay of DNase | [Special Variable] |
| Package [rdata], page 14. | |
| Source [rdata.lisp], page 8. | |
| esoph Smoking, Alcohol and (O)esophageal Cancer | [Special Variable] |
| Package [rdata], page 14. | |
| Source [rdata.lisp], page 8. | |
| euro Conversion Rates of Euro Currencies | [Special Variable] |
| Package [rdata], page 14. | |
| Source [rdata.lisp], page 8. | |
| eustockmarkets Daily Closing Prices of Major European Stock Indices, 1991-1998 | [Special Variable] |
| Package [rdata], page 14. | |
| Source [rdata.lisp], page 8. | |
| faithful Old Faithful Geyser Data | [Special Variable] |
| Package [rdata], page 14. | |
| Source [rdata.lisp], page 8. | |
| formaldehyde Determination of Formaldehyde | [Special Variable] |
| Package [rdata], page 14. | |
| Source [rdata.lisp], page 8. | |
| freeny Freeny's Revenue Data | [Special Variable] |
| Package [rdata], page 14. | |
| Source [rdata.lisp], page 8. | |

| | |
|--|-----------------------|
| haireyecolor | [Special Variable] |
| Hair and Eye Color of Statistics Students | |
| Package | [rdata], page 14. |
| Source | [rdata.lisp], page 8. |
| harman23.cor | [Special Variable] |
| Harman Example 2.3 | |
| Package | [rdata], page 14. |
| Source | [rdata.lisp], page 8. |
| harman74.cor | [Special Variable] |
| Harman Example 7.4 | |
| Package | [rdata], page 14. |
| Source | [rdata.lisp], page 8. |
| index | [Special Variable] |
| Package | [rdata], page 14. |
| Source | [rdata.lisp], page 8. |
| indometh | [Special Variable] |
| Pharmacokinetics of Indomethacin | |
| Package | [rdata], page 14. |
| Source | [rdata.lisp], page 8. |
| infert | [Special Variable] |
| Infertility after Spontaneous and Induced Abortion | |
| Package | [rdata], page 14. |
| Source | [rdata.lisp], page 8. |
| insectsprays | [Special Variable] |
| Effectiveness of Insect Sprays | |
| Package | [rdata], page 14. |
| Source | [rdata.lisp], page 8. |
| iris | [Special Variable] |
| Edgar Anderson's Iris Data | |
| Package | [rdata], page 14. |
| Source | [rdata.lisp], page 8. |
| iris3 | [Special Variable] |
| Edgar Anderson's Iris Data | |
| Package | [rdata], page 14. |
| Source | [rdata.lisp], page 8. |
| islands | [Special Variable] |
| Areas of the World's Major Landmasses | |
| Package | [rdata], page 14. |
| Source | [rdata.lisp], page 8. |

| | |
|---|--------------------|
| johnsonjohnson Quarterly Earnings per Johnson & Johnson Share | [Special Variable] |
| Package [rdata], page 14. | |
| Source [rdata.lisp], page 8. | |
| lakehuron Level of Lake Huron 1875-1972 | [Special Variable] |
| Package [rdata], page 14. | |
| Source [rdata.lisp], page 8. | |
| lh Luteinizing Hormone in Blood Samples | [Special Variable] |
| Package [rdata], page 14. | |
| Source [rdata.lisp], page 8. | |
| lifecyclesavings Intercountry Life-Cycle Savings Data | [Special Variable] |
| Package [rdata], page 14. | |
| Source [rdata.lisp], page 8. | |
| loblolly Growth of Loblolly pine trees | [Special Variable] |
| Package [rdata], page 14. | |
| Source [rdata.lisp], page 8. | |
| longley Longley's Economic Regression Data | [Special Variable] |
| Package [rdata], page 14. | |
| Source [rdata.lisp], page 8. | |
| lynx Annual Canadian Lynx trappings 1821-1934 | [Special Variable] |
| Package [rdata], page 14. | |
| Source [rdata.lisp], page 8. | |
| morley Michelson Speed of Light Data | [Special Variable] |
| Package [rdata], page 14. | |
| Source [rdata.lisp], page 8. | |
| mpg Fuel economy data from 1999 to 2008 for 38 popular models of cars | [Special Variable] |
| Package [rdata], page 14. | |
| Source [rdata.lisp], page 8. | |

| | |
|---|-----------------------|
| mtcars | [Special Variable] |
| Motor Trend Car Road Tests | |
| Package | [rdata], page 14. |
| Source | [rdata.lisp], page 8. |
| nhtemp | [Special Variable] |
| Average Yearly Temperatures in New Haven | |
| Package | [rdata], page 14. |
| Source | [rdata.lisp], page 8. |
| nile | [Special Variable] |
| Flow of the River Nile | |
| Package | [rdata], page 14. |
| Source | [rdata.lisp], page 8. |
| nottem | [Special Variable] |
| Average Monthly Temperatures at Nottingham, 1920-1939 | |
| Package | [rdata], page 14. |
| Source | [rdata.lisp], page 8. |
| npk | [Special Variable] |
| Classical N, P, K Factorial Experiment | |
| Package | [rdata], page 14. |
| Source | [rdata.lisp], page 8. |
| nycflights13-airlines | [Special Variable] |
| Airline name lookup table by carrier code | |
| Package | [rdata], page 14. |
| Source | [rdata.lisp], page 8. |
| nycflights13-airports | [Special Variable] |
| Airport metadata | |
| Package | [rdata], page 14. |
| Source | [rdata.lisp], page 8. |
| nycflights13-flights | [Special Variable] |
| On-time data for all flights that departed NYC (i.e. JFK, LGA or EWR) in 2013 | |
| Package | [rdata], page 14. |
| Source | [rdata.lisp], page 8. |
| nycflights13-planes | [Special Variable] |
| Metadata for all airplane tail numbers found in the FAA aircraft registry | |
| Package | [rdata], page 14. |
| Source | [rdata.lisp], page 8. |

| | |
|--|--------------------|
| nycflights13-weather Hourly meteorological data for LGA, JFK and EWR in 2013 | [Special Variable] |
| Package [rdata], page 14. | |
| Source [rdata.lisp], page 8. | |
| occupationalstatus Occupational Status of Fathers and their Sons | [Special Variable] |
| Package [rdata], page 14. | |
| Source [rdata.lisp], page 8. | |
| orange Growth of Orange Trees | [Special Variable] |
| Package [rdata], page 14. | |
| Source [rdata.lisp], page 8. | |
| orchardsprays Potency of Orchard Sprays | [Special Variable] |
| Package [rdata], page 14. | |
| Source [rdata.lisp], page 8. | |
| plantgrowth Results from an Experiment on Plant Growth | [Special Variable] |
| Package [rdata], page 14. | |
| Source [rdata.lisp], page 8. | |
| precip Annual Precipitation in US Cities | [Special Variable] |
| Package [rdata], page 14. | |
| Source [rdata.lisp], page 8. | |
| presidents Quarterly Approval Ratings of US Presidents | [Special Variable] |
| Package [rdata], page 14. | |
| Source [rdata.lisp], page 8. | |
| pressure Vapor Pressure of Mercury as a Function of Temperature | [Special Variable] |
| Package [rdata], page 14. | |
| Source [rdata.lisp], page 8. | |
| puromycin Reaction Velocity of an Enzymatic Reaction | [Special Variable] |
| Package [rdata], page 14. | |
| Source [rdata.lisp], page 8. | |

| | |
|--|-----------------------|
| quakes | [Special Variable] |
| Locations of Earthquakes off Fiji | |
| Package | [rdata], page 14. |
| Source | [rdata.lisp], page 8. |
| randu | [Special Variable] |
| Random Numbers from Congruential Generator RANDU | |
| Package | [rdata], page 14. |
| Source | [rdata.lisp], page 8. |
| rivers | [Special Variable] |
| Lengths of Major North American Rivers | |
| Package | [rdata], page 14. |
| Source | [rdata.lisp], page 8. |
| rock | [Special Variable] |
| Measurements on Petroleum Rock Samples | |
| Package | [rdata], page 14. |
| Source | [rdata.lisp], page 8. |
| seatbelts | [Special Variable] |
| Road Casualties in Great Britain 1969-84 | |
| Package | [rdata], page 14. |
| Source | [rdata.lisp], page 8. |
| stackloss | [Special Variable] |
| Brownlee's Stack Loss Plant Data | |
| Package | [rdata], page 14. |
| Source | [rdata.lisp], page 8. |
| sunspot.month | [Special Variable] |
| Monthly Sunspot Data, from 1749 to Present | |
| Package | [rdata], page 14. |
| Source | [rdata.lisp], page 8. |
| sunspot.year | [Special Variable] |
| Yearly Sunspot Data, 1700-1988 | |
| Package | [rdata], page 14. |
| Source | [rdata.lisp], page 8. |
| sunspots | [Special Variable] |
| Monthly Sunspot Numbers, 1749-1983 | |
| Package | [rdata], page 14. |
| Source | [rdata.lisp], page 8. |

| | |
|--|--------------------|
| swiss | [Special Variable] |
| Swiss Fertility and Socioeconomic Indicators (1888) Data | |
| Package [rdata], page 14. | |
| Source [rdata.lisp], page 8. | |
| theoph | [Special Variable] |
| Pharmacokinetics of Theophylline | |
| Package [rdata], page 14. | |
| Source [rdata.lisp], page 8. | |
| titanic | [Special Variable] |
| Survival of passengers on the Titanic | |
| Package [rdata], page 14. | |
| Source [rdata.lisp], page 8. | |
| toothgrowth | [Special Variable] |
| The Effect of Vitamin C on Tooth Growth in Guinea Pigs | |
| Package [rdata], page 14. | |
| Source [rdata.lisp], page 8. | |
| treering | [Special Variable] |
| Yearly Treering Data, -6000-1979 | |
| Package [rdata], page 14. | |
| Source [rdata.lisp], page 8. | |
| trees | [Special Variable] |
| Diameter, Height and Volume for Black Cherry Trees | |
| Package [rdata], page 14. | |
| Source [rdata.lisp], page 8. | |
| ucbadmissions | [Special Variable] |
| Student Admissions at UC Berkeley | |
| Package [rdata], page 14. | |
| Source [rdata.lisp], page 8. | |
| ukdriverdeaths | [Special Variable] |
| Road Casualties in Great Britain 1969-84 | |
| Package [rdata], page 14. | |
| Source [rdata.lisp], page 8. | |
| ukgas | [Special Variable] |
| UK Quarterly Gas Consumption | |
| Package [rdata], page 14. | |
| Source [rdata.lisp], page 8. | |

| | |
|---|-----------------------|
| usaccdeaths | [Special Variable] |
| Accidental Deaths in the US 1973-1978 | |
| Package | [rdata], page 14. |
| Source | [rdata.lisp], page 8. |
| usarrests | [Special Variable] |
| Violent Crime Rates by US State | |
| Package | [rdata], page 14. |
| Source | [rdata.lisp], page 8. |
| usjudgeratings | [Special Variable] |
| Lawyers' Ratings of State Judges in the US Superior Court | |
| Package | [rdata], page 14. |
| Source | [rdata.lisp], page 8. |
| uspersonalexpenditure | [Special Variable] |
| Personal Expenditure Data | |
| Package | [rdata], page 14. |
| Source | [rdata.lisp], page 8. |
| uspop | [Special Variable] |
| Populations Recorded by the US Census | |
| Package | [rdata], page 14. |
| Source | [rdata.lisp], page 8. |
| vadeaths | [Special Variable] |
| Death Rates in Virginia (1940) | |
| Package | [rdata], page 14. |
| Source | [rdata.lisp], page 8. |
| volcano | [Special Variable] |
| Topographic Information on Auckland's Maunga Whau Volcano | |
| Package | [rdata], page 14. |
| Source | [rdata.lisp], page 8. |
| warpbreaks | [Special Variable] |
| The Number of Breaks in Yarn during Weaving | |
| Package | [rdata], page 14. |
| Source | [rdata.lisp], page 8. |
| women | [Special Variable] |
| Average Heights and Weights for American Women | |
| Package | [rdata], page 14. |
| Source | [rdata.lisp], page 8. |

worldphones [Special Variable]

The World's Telephones

Package [rdata], page 14.

Source [rdata.lisp], page 8.

wwwusage [Special Variable]

Internet Usage per Minute

Package [rdata], page 14.

Source [rdata.lisp], page 8.

5.1.2 Macros

def (*name value &optional documentation*) [Macro]

Define a data variable

VALUE is not evaluated and must be a symbol. Assigns the value of FORM to VALUE and adds VALUE to the list *VARIABLES* of def'ed variables. Returns VALUE. If VALUE is already bound and the global variable *ASK-ON-REDEFINE* is not nil then you are asked if you want to redefine the variable.

Package [lisp-stat], page 13.

Source [variables.lisp], page 7.

5.1.3 Ordinary functions

data (*d &key system directory type*) [Function]

Load a data frame from a CSV or LISP data source located on the local filesystem named by D. Intended for example data sets for Lisp-Stat system. Parameters may be either a KEYWORD or STRING. JSON files require application specific loaders, so not handled here. Use (read-vega ...) for example.

Description

Each package using lisp-stat should define its own logical host, and a directory called DATA. Once done, you can load the example data sets like so:

```
LS-USER> (data my-example :system :glimpse)
```

If the system is named GLIMPSE. To load a data set from R, assuming you have configured a logical host, RDATA:

```
LS-USER> (data :antigua :system :rdata :directory :daag :type :csv)
```

Package [lisp-stat], page 13.

Source [data.lisp], page 7.

fivenum (*x &key tukey*) [Function]

By default, returns the five number summary (min, 1st quartile, median, 3rd quartile, max) of the elements X. If the keyword :tukey is set to a non-nil value, Tukey's fivenum summary is computed instead.

Package [lisp-stat], page 13.

Source [stats.lisp], page 10.

- interquartile-range** (*x*) [Function]
Returns the interquartile range of the elements of *X*.
Package [lisp-stat], page 13.
Source [stats.lisp], page 10.
- load-r-default-datasets** () [Function]
Load the data sets included in base R
Package [rdata], page 14.
Source [rdata.lisp], page 8.
- load-r-metadata** () [Function]
Loads the master R data set index as a data frame. Use this to query the R data sets.
Package [rdata], page 14.
Source [rdata.lisp], page 8.
- save-r-data** () [Function]
Package [rdata], page 14.
Source [rdata.lisp], page 8.
- save-r-default-datasets** () [Function]
Save the data sets included in base R
Package [rdata], page 14.
Source [rdata.lisp], page 8.
- savevar** (*vars file &optional suffix*) [Function]
VARS is a symbol or a list of symbols. FILE is a string (or a symbol whose print name is used) not ending in SUFFIX (defaults to ".lisp"). The VARS and their current values are written to the file FILE.lisp in a form suitable for use with the load command. NOTE: Ensure VARS doesn't contain CLOS objects that don't have a SAVE-OBJ method. Example (savevar 'urban "urban")
Package [lisp-stat], page 13.
Source [variables.lisp], page 7.
- undef-var** (*v*) [Function]
Remove *V* from the system
If *V* is the symbol of a defined variable the variable it is unbound and removed from the list of defined variables. If *V* is a list of variable names each is unbound and removed. Returns *V*. Example: (undef 'urban)
Package [lisp-stat], page 13.
Source [variables.lisp], page 7.
- variables** () [Function]
Returns a list of the names of all def'ed variables.
Package [lisp-stat], page 13.
Source [variables.lisp], page 7.

5.2 Internals

5.2.1 Special variables

r-default-dataframes [Special Variable]
Data frames corresponding to the default R datasets

Package [rdata], page 14.

Source [rdata.lisp], page 8.

variables [Special Variable]

Package [lisp-stat], page 13.

Source [variables.lisp], page 7.

iris [Special Variable]
Edgar Anderson's Iris Data

Description

This famous (Fisher's or Anderson's) iris data set gives the measurements in centimeters of the variables sepal length and width and petal length and width, respectively, for 70 flowers from each of 3 species of iris. The species are *Iris setosa*, *versicolor*, and *virginica*.

Source

Fisher, R. A. (1937) The use of multiple measurements in taxonomic problems. *Annals of Eugenics*, 7, Part II, 179–188. The data were collected by Anderson, Edgar (1937). The irises of the Gaspe Peninsula, *Bulletin of the American Iris Society*, 79, 2–7

References

Becker, R. A., Chambers, J. M. and Wilks, A. R. (1988) *The New S Language*. Wadsworth & Brooks/Cole. (has `iris3` as `iris`.)

Examples (from R)

```
dni3 <- dimnames(iris3)
ii <- data.frame(matrix(aperm(iris3, c(1,3,2)), ncol = 4,
dimnames = list(NULL, sub(" L.", ".Length", sub(" W.", ".Width", dni3[[2]]))), Species =
gl(3, 50, labels = sub("S", "s", sub("V", "v", dni3[[3]])))) all.equal(ii, iris) # TRUE
```

Package [ls-user], page 13.

mtcars [Special Variable]
Motor Trend Car Road Tests

Description

The data was extracted from the 1974 Motor Trend US magazine, and comprises fuel consumption and 10 aspects of automobile design and performance for 32 automobiles (1973–74 models).

Note

Henderson and Velleman (1981) comment in a footnote to Table 1: ‘Hocking [original transcriber]’s noncrucial coding of the Mazda’s rotary engine as a straight six-cylinder engine and

the Porsche's flat engine as a V engine, as well as the inclusion of the diesel Mercedes 240D, have been retained to enable direct comparisons to be made with previous analyses.'

Source

Henderson and Velleman (1981), Building multiple regression models interactively. *Biometrics*, 37, 391–411.

Package [ls-user], page 13.

plant-growth

[Special Variable]

Results from an Experiment on Plant Growth

Description

Results from an experiment to compare yields (as measured by dried weight of plants) obtained under a control and two different treatment conditions.

Format

A data frame of 30 cases on 2 variables.

[, 1] weight numeric

[, 2] group factor

The levels of group are 'ctrl', 'trt1', and 'trt2'.

Source

Dobson, A. J. (1983) *An Introduction to Statistical Modelling*. London: Chapman and Hall.

Examples (from R)

```
## One factor ANOVA example from Dobson's book, cf. Table 7.4: require(stats); require(graphics)
boxplot(weight ~ group, data = PlantGrowth, main = "PlantGrowth data", ylab = "Dried weight of plants", col = "lightgray",
notch = TRUE, varwidth = TRUE)
anova(lm(weight ~ group, data = PlantGrowth))
```

Package [ls-user], page 13.

student-sleep

[Special Variable]

Student's Sleep Data

Package [rdata], page 14.

Source [rdata.lisp], page 8.

tooth-growth

[Special Variable]

The Effect of Vitamin C on Tooth Growth in Guinea Pigs

Description

The response is the length of odontoblasts (cells responsible for tooth growth) in 60 guinea pigs. Each animal received one of three dose levels of vitamin C (0.5, 1, and 2 mg/day) by one of two delivery methods, orange juice or ascorbic acid (a form of vitamin C and coded as VC).

Format

A data frame with 60 observations on 3 variables.

[,1] len numeric Tooth length

[,2] supp factor Supplement type (VC or OJ).

[,3] dose numeric Dose in milligrams/day

Source

C. I. Bliss (1952). *The Statistics of Bioassay*. Academic Press.

References

- McNeil, D. R. (1977). *Interactive Data Analysis*. New York: Wiley.

- Crampton, E. W. (1947). The growth of the odontoblast of the incisor teeth as a criterion of vitamin C intake of the guinea pig. *The Journal of Nutrition*, 33(5), 491–504. doi: 10.1093/jn/33.5.491.

Examples

require(graphics)

```
coplot(len ~ dose | supp, data = ToothGrowth, panel = panel.smooth, xlab = "ToothGrowth
data: length vs dose, given type of supplement")
```

Package [ls-user], page 13.

usarrests

[Special Variable]

Violent Crime Rates by US State

Description

This data set contains statistics, in arrests per 100,000 residents, for assault, murder, and rape in each of the 50 US states in 1973.

Also given is the percent of the population living in urban areas.

Note

USArrests contains the data as in McNeil's monograph. For the UrbanPop percentages, a review of the table (No. 21) in the Statistical

Abstracts 1975 reveals a transcription error for Maryland (and that McNeil used the same "round to even" rule that R's round() uses), as found by Daniel S Coven (Arizona).

See the example below on how to correct the error and improve accuracy for the '<n>.5' percentages.

Source

World Almanac and Book of facts 1975. (Crime rates).

Statistical Abstracts of the United States 1975, p.20, (Urban rates), possibly available as <https://books.google.ch/books?id=zl9qAAAAMAAJ&pg=PA20>.

References

McNeil, D. R. (1977) *Interactive Data Analysis*. New York: Wiley.

Examples

```
(summary usarrests)
```

```
;; Difference between 'USArrests' and its correction
(which usarrests:x3 :predicate (lambda (x) (string= "Maryland" x))) ; #(19) (select usarrests
19 'urbanpop) ; 67, the value transcribed incorrectly (setf (elt usarrests:urbanpop 19) 76.6)
; change to the correct value
```

```
;; correct rounding errors of +/- 0.5 to restore the original <n>.5 percentages (map nil (lambda
(x)
(setf (elt usarrests:urbanpop x)
(+ 0.5 (elt usarrests:urbanpop x))))
(which usarrests:x3 :predicate (lambda (x)
(or (string= "Colorado" x)
(string= "Florida" x)
(string= "Mississippi" x)
(string= "Wyoming" x)))))
```

```
(map nil (lambda (x)
(setf (elt usarrests:urbanpop x)
(- 0.5 (elt usarrests:urbanpop x))))
(which usarrests:x3 :predicate (lambda (x)
(or (string= "Nebraska" x)
(string= "Pennsylvania" x)))))
```

Package [ls-user], page 13.

5.2.2 Ordinary functions

setup-ls-translations () [Function]

Package [lisp-stat], page 13.

Source [ls-init.lisp], page 10.

5.2.3 Generic functions

save-obj (*data*) [Generic Function]

Save data object

Package [lisp-stat], page 13.

Source [variables.lisp], page 7.

Appendix A Indexes

A.1 Concepts

(Index is nonexistent)

A.2 Functions

D

| | |
|-------------------------|----|
| <code>data</code> | 27 |
| <code>def</code> | 27 |

F

| | |
|--|----|
| <code>fivenum</code> | 27 |
| Function, <code>data</code> | 27 |
| Function, <code>fivenum</code> | 27 |
| Function, <code>interquartile-range</code> | 28 |
| Function, <code>load-r-default-datasets</code> | 28 |
| Function, <code>load-r-metadata</code> | 28 |
| Function, <code>save-r-data</code> | 28 |
| Function, <code>save-r-default-datasets</code> | 28 |
| Function, <code>savevar</code> | 28 |
| Function, <code>setup-ls-translations</code> | 32 |
| Function, <code>undef-var</code> | 28 |
| Function, <code>variables</code> | 28 |

G

| | |
|---|----|
| Generic Function, <code>save-obj</code> | 32 |
|---|----|

I

| | |
|--|----|
| <code>interquartile-range</code> | 28 |
|--|----|

L

| | |
|--|----|
| <code>load-r-default-datasets</code> | 28 |
| <code>load-r-metadata</code> | 28 |

M

| | |
|-------------------------------|----|
| Macro, <code>def</code> | 27 |
|-------------------------------|----|

S

| | |
|--|----|
| <code>save-obj</code> | 32 |
| <code>save-r-data</code> | 28 |
| <code>save-r-default-datasets</code> | 28 |
| <code>savevar</code> | 28 |
| <code>setup-ls-translations</code> | 32 |

U

| | |
|------------------------------|----|
| <code>undef-var</code> | 28 |
|------------------------------|----|

V

| | |
|------------------------------|----|
| <code>variables</code> | 28 |
|------------------------------|----|

A.3 Variables

*

| | |
|------------------------|----|
| *r-default-dataframes* | 29 |
| *r-default-datasets* | 17 |
| *variables* | 29 |

A

| | |
|---------------|----|
| ability.cov | 17 |
| airmiles | 17 |
| airpassengers | 17 |
| airquality | 17 |
| anscombe | 17 |
| attenu | 17 |
| attitude | 17 |
| austres | 18 |

B

| | |
|----------|----|
| base-url | 18 |
| bjsales | 18 |
| bod | 18 |

C

| | |
|-------------|----|
| cars | 18 |
| chickweight | 18 |
| chickwts | 18 |
| co2-1 | 18 |
| co2-2 | 18 |
| crimtab | 19 |

D

| | |
|-------------|----|
| discoveries | 19 |
| dnase | 19 |

E

| | |
|----------------|----|
| esoph | 19 |
| euro | 19 |
| eustockmarkets | 19 |

F

| | |
|--------------|----|
| faithful | 19 |
| formaldehyde | 19 |
| freeny | 19 |

H

| | |
|--------------|----|
| haireyecolor | 20 |
| harman23.cor | 20 |
| harman74.cor | 20 |

I

| | |
|--------------|--------|
| index | 20 |
| indometh | 20 |
| infert | 20 |
| insectsprays | 20 |
| iris | 20, 29 |
| iris3 | 20 |
| islands | 20 |

J

| | |
|----------------|----|
| johnsonjohnson | 21 |
|----------------|----|

L

| | |
|------------------|----|
| lakehuron | 21 |
| lh | 21 |
| lifecyclesavings | 21 |
| loblolly | 21 |
| longley | 21 |
| lynx | 21 |

M

| | |
|--------|--------|
| morley | 21 |
| mpg | 21 |
| mtcars | 22, 29 |

N

| | |
|-----------------------|----|
| nhtemp | 22 |
| nile | 22 |
| nottem | 22 |
| npk | 22 |
| nycflights13-airlines | 22 |
| nycflights13-airports | 22 |
| nycflights13-flights | 22 |
| nycflights13-planes | 22 |
| nycflights13-weather | 23 |

O

| | |
|--------------------|----|
| occupationalstatus | 23 |
| orange | 23 |
| orchardsprays | 23 |

P

| | |
|--------------|----|
| plant-growth | 30 |
| plantgrowth | 23 |
| precip | 23 |
| presidents | 23 |
| pressure | 23 |
| puromycin | 23 |

Q

| | |
|--------|----|
| quakes | 24 |
|--------|----|

R

| | |
|---------------------------|----|
| <code>randu</code> | 24 |
| <code>rivers</code> | 24 |
| <code>rock</code> | 24 |

S

| | |
|---|--------|
| <code>seatbelts</code> | 24 |
| Special Variable, <code>*r-default-dataframes*</code> | 29 |
| Special Variable, <code>*r-default-datasets*</code> | 17 |
| Special Variable, <code>*variables*</code> | 29 |
| Special Variable, <code>ability.cov</code> | 17 |
| Special Variable, <code>airmiles</code> | 17 |
| Special Variable, <code>airpassengers</code> | 17 |
| Special Variable, <code>airquality</code> | 17 |
| Special Variable, <code>anscombe</code> | 17 |
| Special Variable, <code>attenu</code> | 17 |
| Special Variable, <code>attitude</code> | 17 |
| Special Variable, <code>austres</code> | 18 |
| Special Variable, <code>base-url</code> | 18 |
| Special Variable, <code>bjsales</code> | 18 |
| Special Variable, <code>bod</code> | 18 |
| Special Variable, <code>cars</code> | 18 |
| Special Variable, <code>chickweight</code> | 18 |
| Special Variable, <code>chickwts</code> | 18 |
| Special Variable, <code>co2-1</code> | 18 |
| Special Variable, <code>co2-2</code> | 18 |
| Special Variable, <code>crimtab</code> | 19 |
| Special Variable, <code>discoveries</code> | 19 |
| Special Variable, <code>dnase</code> | 19 |
| Special Variable, <code>esoph</code> | 19 |
| Special Variable, <code>euro</code> | 19 |
| Special Variable, <code>eustockmarkets</code> | 19 |
| Special Variable, <code>faithful</code> | 19 |
| Special Variable, <code>formaldehyde</code> | 19 |
| Special Variable, <code>freeny</code> | 19 |
| Special Variable, <code>haireyecolor</code> | 20 |
| Special Variable, <code>harman23.cor</code> | 20 |
| Special Variable, <code>harman74.cor</code> | 20 |
| Special Variable, <code>index</code> | 20 |
| Special Variable, <code>indometh</code> | 20 |
| Special Variable, <code>infert</code> | 20 |
| Special Variable, <code>insectsprays</code> | 20 |
| Special Variable, <code>iris</code> | 20, 29 |
| Special Variable, <code>iris3</code> | 20 |
| Special Variable, <code>islands</code> | 20 |
| Special Variable, <code>johnsonjohnson</code> | 21 |
| Special Variable, <code>lakehuron</code> | 21 |
| Special Variable, <code>lh</code> | 21 |
| Special Variable, <code>lifecyclesavings</code> | 21 |
| Special Variable, <code>loblolly</code> | 21 |
| Special Variable, <code>longley</code> | 21 |
| Special Variable, <code>lynx</code> | 21 |
| Special Variable, <code>morley</code> | 21 |
| Special Variable, <code>mpg</code> | 21 |
| Special Variable, <code>mtcars</code> | 22, 29 |
| Special Variable, <code>nhtemp</code> | 22 |
| Special Variable, <code>nile</code> | 22 |
| Special Variable, <code>nottem</code> | 22 |
| Special Variable, <code>npk</code> | 22 |
| Special Variable, <code>nycflights13-airlines</code> | 22 |
| Special Variable, <code>nycflights13-airports</code> | 22 |
| Special Variable, <code>nycflights13-flights</code> | 22 |
| Special Variable, <code>nycflights13-planes</code> | 22 |

| | |
|--|--------|
| Special Variable, <code>nycflights13-weather</code> | 23 |
| Special Variable, <code>occupationalstatus</code> | 23 |
| Special Variable, <code>orange</code> | 23 |
| Special Variable, <code>orchardsprays</code> | 23 |
| Special Variable, <code>plant-growth</code> | 30 |
| Special Variable, <code>plantgrowth</code> | 23 |
| Special Variable, <code>precip</code> | 23 |
| Special Variable, <code>presidents</code> | 23 |
| Special Variable, <code>pressure</code> | 23 |
| Special Variable, <code>puromycin</code> | 23 |
| Special Variable, <code>quakes</code> | 24 |
| Special Variable, <code>randu</code> | 24 |
| Special Variable, <code>rivers</code> | 24 |
| Special Variable, <code>rock</code> | 24 |
| Special Variable, <code>seatbelts</code> | 24 |
| Special Variable, <code>stackloss</code> | 24 |
| Special Variable, <code>student-sleep</code> | 30 |
| Special Variable, <code>sunspot.month</code> | 24 |
| Special Variable, <code>sunspot.year</code> | 24 |
| Special Variable, <code>sunspots</code> | 24 |
| Special Variable, <code>swiss</code> | 25 |
| Special Variable, <code>theoph</code> | 25 |
| Special Variable, <code>titanic</code> | 25 |
| Special Variable, <code>tooth-growth</code> | 30 |
| Special Variable, <code>toothgrowth</code> | 25 |
| Special Variable, <code>treering</code> | 25 |
| Special Variable, <code>trees</code> | 25 |
| Special Variable, <code>ucbadmissions</code> | 25 |
| Special Variable, <code>ukdriverdeaths</code> | 25 |
| Special Variable, <code>ukgas</code> | 25 |
| Special Variable, <code>usaccdeaths</code> | 26 |
| Special Variable, <code>usarrests</code> | 26, 31 |
| Special Variable, <code>usjudgeratings</code> | 26 |
| Special Variable, <code>uspersonalexpenditure</code> | 26 |
| Special Variable, <code>uspop</code> | 26 |
| Special Variable, <code>vadeaths</code> | 26 |
| Special Variable, <code>volcano</code> | 26 |
| Special Variable, <code>warpbreaks</code> | 26 |
| Special Variable, <code>women</code> | 26 |
| Special Variable, <code>worldphones</code> | 27 |
| Special Variable, <code>wwwusage</code> | 27 |
| <code>stackloss</code> | 24 |
| <code>student-sleep</code> | 30 |
| <code>sunspot.month</code> | 24 |
| <code>sunspot.year</code> | 24 |
| <code>sunspots</code> | 24 |
| <code>swiss</code> | 25 |

T

| | |
|---------------------------------|----|
| <code>theoph</code> | 25 |
| <code>titanic</code> | 25 |
| <code>tooth-growth</code> | 30 |
| <code>toothgrowth</code> | 25 |
| <code>treering</code> | 25 |
| <code>trees</code> | 25 |

U

| | |
|----------------------------|--------|
| ucbadmissions..... | 25 |
| ukdriverdeaths..... | 25 |
| ukgas..... | 25 |
| usaccdeaths..... | 26 |
| usarrests..... | 26, 31 |
| usjudgeratings..... | 26 |
| uspersonalexpenditure..... | 26 |
| uspop..... | 26 |

V

| | |
|---------------|----|
| vadeaths..... | 26 |
| volcano..... | 26 |

W

| | |
|------------------|----|
| warpbreaks..... | 26 |
| women..... | 26 |
| worldphones..... | 27 |
| wwwusage..... | 27 |

A.4 Data types

B

base 5

D

data.lisp 7

doc-strings.lisp 10

docs 5

F

File, data.lisp 7

File, doc-strings.lisp 10

File, license 11

File, lisp-stat.asd 7

File, ls-init.lisp 10

File, pkgdcls.lisp 7

File, rdata.lisp 8

File, stats.lisp 10

File, variables.lisp 7

L

license 11

lisp-stat 3, 13

lisp-stat.asd 7

ls-init.lisp 10

ls-user 13

M

Module, base 5

Module, docs 5

Module, statistics 5

P

Package, lisp-stat 13

Package, ls-user 13

Package, rdata 14

pkgdcls.lisp 7

R

rdata 14

rdata.lisp 8

S

statistics 5

stats.lisp 10

System, lisp-stat 3

V

variables.lisp 7