# Package: exCon (via r-universe)

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**Type** Package

**Title** Interactive Exploration of Contour Data

**Version** 0.2.5

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**Description** Interactive tools to explore topographic-like data sets. Such data sets take the form of a matrix in which the rows and columns provide location/frequency information, and the matrix elements contain altitude/response information. Such data is found in cartography, 2D spectroscopy and chemometrics. The functions in this package create interactive web pages showing the contoured data, possibly with slices from the original matrix parallel to each dimension. The interactive behavior is created using the 'D3.js' 'JavaScript' library by Mike Bostock.

**License** GPL-3

**Imports** jsonlite, grDevices, utils

**Suggests** js

**URL** https://github.com/bryanhanson/exCon

**ByteCompile** TRUE

**BugReports** https://github.com/bryanhanson/exCon/issues

**Depends** R (>= 3.0)

**RoxygenNote** 6.0.1

**Repository** https://bryanhanson.r-universe.dev

**RemoteUrl** https://github.com/bryanhanson/excon

**RemoteRef** HEAD

**RemoteSha** 13d25d8491ea20b688d48ec1d3d7ef2c2427024f

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## exCon-package *Explore Contour Data Interactively*

### Description

exCon: Explore Contour Data Interactively

### Details

Interactive tools to explore topographic-like data sets. Such data sets take the form of a matrix in which the rows and contain altitude/response information. Such data is found in cartography, 2D spectroscopy and chemometrics. The functions in this package create interactive web pages showing the contoured data, possibly with slices from the original matrix parallel to each dimension. The interactive behavior is created using the D3.js 'JavaScript' library by Mike Bostock.

### Author(s)

Bryan A. Hanson & Kristina R. Multry

## exCon *Explore Contour Data Interactively*

### Description

These functions compute contour lines from matrix data and display them in an interactive web page using the d3 javascript library. `exCon` displays slices along the x and y directions. `exCon2` does not display the slices and is faster.

### Usage

```
exCon(M = NULL, x = seq(0, 1, length.out = nrow(M)), y = seq(0, 1,
  length.out = ncol(M)), nlevels = 5, levels = pretty(range(M, na.rm =
  TRUE), nlevels), browser = NULL, minify = TRUE)

exCon2(M = NULL, x = seq(0, 1, length.out = nrow(M)), y = seq(0, 1,
  length.out = ncol(M)), nlevels = 5, levels = pretty(range(M, na.rm =
  TRUE), nlevels), browser = NULL, minify = TRUE)
```

### Arguments

| | |
|---|---|
| `M` | A matrix. |
| `x` | A vector of numeric values giving the locations of the grid defining the matrix. Must have length `nrow(M)`. These values become the scale along the x axis. |
| `y` | A vector of numeric values giving the locations of the grid defining the matrix. Must have length `ncol(M)`. These values become the scale along the y axis. |

| | |
|---|---|
| nlevels | Integer. The number of contour levels desired. Ignored if levels is given. |
| levels | Numeric. A vector of values (altitudes if you will) at which to compute the contours. |
| browser | Character. Something that will make sense to your OS. Only necessary if you want to overide your system specified browser as understood by R. See below for further details. |
| minify | Logical. Shall the JavaScript be minified? This improves performance. However, it requires package js which in turn requires package V8. The latter is not available on all platforms. Details may be available at https://github.com/jeroenooms/v8 |

## Value

The path to the temporary directory containing the web page files. is returned invisibly. The side effect is an interactive web page. The temporary directory is deleted when you quit R, but you can use the return value to save the files to a different location.

## Functions

- exCon: Interactive contour display with slices
- exCon2: Interactive contour display without slices

## Details

The computation of the contour lines is handled by contourLines. The result here, however, is transposed so that the output has the same orientation as the original matrix. This is necessary because contour tranposes its output: "Notice that contour interprets the z matrix as a table of f(x[i], y[j]) values, so that the x axis corresponds to row number and the y axis to column number, with column 1 at the bottom, i.e. a 90 degree counter-clockwise rotation of the conventional textual layout."

## Interpretation

The contour lines are an interpolation of the data in the matrix. In exCon, the slices are the actual values in the matrix row or column connected point-to-point. Thus a maximum in a slice may not correspond to a peak in the contour plot.

## Browser Choice

The browser is called by browseURL, which in turn uses options("browser"). Exactly how this is handled is OS dependent.

## Firefox Browser

the slices chosen and the values displayed are correct.

## RStudio Viewer

If browser is NULL, you are using RStudio, and a viewer is specified, this will be called. You can stop this by with options(viewer = NULL).

### Browser Choice (Mac)

On a Mac, the default browser is called by `/bin/sh/open` which in turn looks at which browser you have set in the system settings. You can override your default with `browser = "/usr/bin/open -a 'Google Chrome'"` for example.

### Browser Choice & Performance

You can check the performance of your browser at peacekeeper.futuremark.com The most relevant score for exCon is the rendering category.

### Performance Limits (YMMV)

On a early 2015 MacBook Pro, with 16 Gb RAM and an 2.9 GHz Intel Core i5 chip, a 1500 x 1500 matrix with 1 contour level requires about 15 seconds for R to render the web page using Chrome, Safari or Firefox. A 2K x 2K matrix appears to be too large to handle. R seems to hang during the handoff to the browser.

### Examples

```
if (interactive()) {
require(jsonlite)

# minify is FALSE in the examples as not all platforms support the required pkgs (see above)

exCon(M = volcano, minify = FALSE)

exCon2(M = volcano, minify = FALSE) # no slices

# This next example will label the axes with the actual values, relative to the
# lower left corner (original data collected on 10 meter grid).  Giving
# x and y affects only the scale, and the native values displayed at the top.

 exCon(M = volcano, minify = FALSE,
 x = seq(from = 0, by = 10, length.out = nrow(volcano)),
 y = seq(from = 0, by = 10, length.out = ncol(volcano)))
}
```

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