iemisc: Additional Examples from GNU Octave Compatible cosd Function

Irucka Embry, E.I.T. (EcoC²S)

2023-03-03

Contents

cosd Examples (R style)

```
library("iemisc")

# Examples from GNU Octave cosd

cosd(c(0, 180, 360))

## [1]  1 -1  1
cosd(c(90, 270, 45))

## [1] 0.0000000 0.0000000 0.7071068
try(cosd(pi * seq(0, 80, by = 10)/180))

## [1] 1.0000000 0.9999954 0.9999814 0.9999582 0.9999258 0.9998840 0.9998330
## [8] 0.9997727 0.9997031
# gives error message since the computed value is in radians rather than
# degrees


cos(pi * seq(0, 80, by = 10)/180)

## [1] 1.0000000 0.9848078 0.9396926 0.8660254 0.7660444 0.6427876 0.5000000
## [8] 0.3420201 0.1736482
```

```
# this is correct since `cos` expects the angle in radians

try(cosd(seq(0, 80, by = 10) * 180/pi))

## [1]  1.0000000 -0.8390715  0.4080821  0.1542514 -0.6669381  0.9649660 -0.9524130
## [8]  0.6333192 -0.1103872
# converts angles in radians to degrees; however, it will still receive an
# error message with this current implementation. You can use the work-around
# below:

xx <- seq(0, 80, by = 10) * 180/pi

cosd(xx)

## [1]  1.0000000 -0.8390715  0.4080821  0.1542514 -0.6669381  0.9649660 -0.9524130
## [8]  0.6333192 -0.1103872
try(cos(seq(0, 80, by = 10) * 180/pi))

## [1]  1.00000000  0.37357878 -0.72087779 -0.91218807  0.03932958  0.94157346
## [7]  0.66417415 -0.44533073 -0.99690637
# converts angles in radians to degrees; however, this is incorrect since `cos`
# expects the angle in radians and not degrees


cosd(90)

## [1] 0
cos(pi/2)

## [1] 6.123234e-17
```

cosd and cos Examples (GNU Octave style)

```
cosd(90)

cos(pi/2)



% results

>> cosd(90)
ans = 0
>>
>> cos(pi/2)
ans =    6.1232e-17
>>
```

Works Cited

Design Guide No. 1110-1-3: Air Stripping Engineering and Design Appendix D: Example Air Stripping By Packed Column, Department Of The Army U.S. Army Corps of Engineers, 31 October 2001, pages D-1 - D-18, http://www.publications.usace.army.mil/Portals/76/Publications/EngineerDesignGuides/DG_1110-1-3.pdf?ver=2013-08-16-101222-003.

EcoC²S Links

EcoC²S Home – https://www.ecoccs.com/
About EcoC²S – https://www.ecoccs.com/about_ecoc2s.html
Products – https://www.questionuniverse.com/products.html
EcoC²S Media – https://www.ecoccs.com/media.html
EcoC²S Resources – https://www.ecoccs.com/resources.html
R Trainings and Resources provided by EcoC²S (Irucka Embry, E.I.T.) – https://www.ecoccs.com/rtraining.html

Copyright and License

All R code written by Irucka Embry is distributed under the GPL-3 (or later) license, see the GNU General Public License {GPL} page.

All written content originally created by Irucka Embry is copyrighted under the Creative Commons Attribution-ShareAlike 4.0 International License. All other written content retains the copyright of the original author(s).

This work is licensed under a Creative Commons Attribution-ShareAlike 4.0 International License.