

iemisc: Additional Examples from GNU Octave Compatible cosd Function

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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)

## ans = 0
## 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.

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