

Package ‘gunit’

October 18, 2022

Type Package

Title Converts Conductance Units

Version 1.0.2

Description For plant physiologists, converts conductance (e.g. stomatal conductance) to different units: m/s, mol/m²/s, and umol/m²/s/Pa.

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Encoding UTF-8

Suggests testthat

RoxygenNote 7.2.1

Imports magrittr (>= 1.5), methods (>= 4.0.0), stringr (>= 1.4.0),
units (>= 0.6.0), tibble (>= 2.1.1)

URL <https://github.com/cdmuir/gunit>

BugReports <https://github.com/cdmuir/gunit/issues>

NeedsCompilation no

Author Chris Muir [aut, cre] (<<https://orcid.org/0000-0003-2555-3878>>)

Maintainer Chris Muir <cdmuir@hawaii.edu>

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convert_conductance *Convert conductance units*

Description

Convert conductance units

Usage

```
convert_conductance(  
  .g,  
  P = set_units(101.3246, kPa),  
  R = set_units(8.31446, J/K/mol),  
  Temp = set_units(298.15, K)  
)
```

Arguments

.g	Conductance in class units. Units must be convertible to one of "m/s", "umol/m ² /s/Pa", or "mol/m ² /s"
P	A pressure value of class units that is convertible to kPa. Default is 101.3246 kPa, Earth's atmospheric pressure at sea level.
R	Ideal gas constant of class units that is convertible to J/K/mol. Default is 8.31446 J/K/mol.
Temp	A temperature value of class units that is convertible to K. Default is 25 degreeC (298.15 K).

Value

@return a [tibble](#) in units "m/s", "umol/m²/s/Pa", and "mol/m²/s".

Examples

```
# library(gunit)  
library(units)  
  
g_sc <- set_units(10, "m/s")  
convert_conductance(g_sc)  
  
g_sc <- set_units(4, "umol/m^2/s/Pa")  
convert_conductance(g_sc)  
  
g_sc <- set_units(0.4, "mol/m^2/s")  
convert_conductance(g_sc)
```

gunit	<i>gunit package</i>
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Description

Convert Conductance Units

Details

See the README on [GitHub](#)

gw2gc	<i>Convert g_c ($\mu\text{mol CO}_2/\text{m}^2/\text{s}/\text{Pa}$) to g_w ($\mu\text{mol H}_2\text{O}/\text{m}^2/\text{s}/\text{Pa}$)</i>
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Description

Convert g_c ($\mu\text{mol CO}_2/\text{m}^2/\text{s}/\text{Pa}$) to g_w ($\mu\text{mol H}_2\text{O}/\text{m}^2/\text{s}/\text{Pa}$)

Convert g_c (umol CO2/m^2/s/Pa) to g_w (umol H2O /m^2/s/Pa)

Usage

gw2gc(g_w, D_c, D_w, unitless, a)

gc2gw(g_c, D_c, D_w, unitless, a)

Arguments

g_w	conductance to water vapor in units ($\mu\text{mol H}_2\text{O}/(\text{m}^2 \text{ s Pa})$) of class units.
D_c	diffusion coefficient for CO2 in air in units of m^2/s of class units
D_w	diffusion coefficient for H2O in air in units of m^2/s of class units
unitless	Logical. Should scientific units of arguments be checked and set? TRUE is safer, but slower. If FALSE, values provided are assumed to be in correct units.
a	exponent used for conversion. Use 1 for still air; 0.67 for laminar flow (Jones 2014). Should be unitless.
g_c	conductance to CO2 in units ($\mu\text{mol H}_2\text{O}/(\text{m}^2 \text{ s Pa})$) of class units.

Details

Diffusive conductance to CO2 is greater than that of H2O because of the higher molecular weight. To convert:

$$g_c = g_w(D_c/D_w)^a$$

$$g_w = g_c(D_w/D_c)^a$$

Value

Value with units $\mu\text{mol} / (\text{m}^2 \text{ s Pa})$ of class units.

Note

This function will soon be moving to the standalone gunit package.

References

Jones H. 2014. Plants and Microclimate (3rd edition). Cambridge University Press.

Examples

```
library(units)
D_c = set_units(1.29e-05, "m^2/s")
D_w = set_units(2.12e-05, "m^2/s")
g_c = set_units(3, "umol/m^2/s/Pa")
a = 1
g_w = gc2gw(g_c, D_c, D_w, a, unitless = FALSE)
g_w

gw2gc(g_w, D_c, D_w, a, unitless = FALSE)
```

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