

Manual for Package: physics

Revision 1:5M

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1 @Constant

1.1 Constant

Constant and physical standard quantities

1.2 celsius_to_kelvin

convert temperature from degree Celsius to Kelvin
function t_K = celsius_to_kelvin(t_C)

1.3 depth_to_pressure

convert depth to pressure in fresh water at standard temperature

$$z = (p - p_0) / (\rho \cdot g)$$
$$\Rightarrow p = \rho \cdot g \cdot z + p_0$$

input :

p0 : nx1 or scalar, pressure at water surface in BAR

d : depth in metre

output :

p : nx1, pressure at measurement depth in BAR

1.4 kelvin_to_celsius

convert temperature degree Kelvin to Celsius

1.5 optical_attenuation

1.6 pressure_to_depth

convert pressure to depth in fresh water at standard temperature

$$z = (p - p_0) / (\rho \cdot g)$$

input:

p : nx1, pressure at measurement depth in BAR

p0 : nx1 or scalar, pressure at water surface in BAR

output:

d : depth in metre

1.7 saturation_vapor_pressure

1.8 sound_absorption_air

1.9 sound_absorption_water

sound absorption in water
following Francois and Garrison, 1982

```
function alpha = sound_absorption(f,S,D,T)
```

input:

f : frequency (Hz)

S : salinity

D : depth (m)

T : temperature (degree C)

output:

alpha = sound attenuation in dB/m (not dB/km)

```
function alpha = sound_absorption(f,S,D,T,model)
```

1.10 sound_velocity_water

sound velocity in water
following Lubbers and Graaff (1998)
this formula does not include depth and salinity effects

2 physics

2.1 beam_bending_deflection

2.2 beam_bending_moment

2.3 beam_bending_strain

2.4 beam_bending_stress

2.5 bolt_stress

2.6 drag_force

2.7 moment_of_inertia_rectangle

2.8 moment_of_inertia_ring

2.9 test_sound_absorption_air