seaice Documentation

Release 0.1b

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ONE

THE SEAICE MODULE

SeaIce

Package name seaice

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URL https://github.com/anders-dc/seaice

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class `seaice.`**`IceFloeCylindrical`**(*lin_pos, thickness, contact_radius, areal_radius=None, lin_vel=[0.0, 0.0], lin_acc=[0.0, 0.0], force=[0.0, 0.0], ang_pos=0.0, ang_vel=0.0, ang_acc=0.0, torque=0.0, density=934.0, rotating=True, fixed=False*)

Cylindrical ice floe object.

Parameters

- **`lin_pos`** (*`list or numpy.array`*) – Floe linear position [m]
- **`thickness`** (*`float`*) – Floe thickness [m]
- **`contact_radius`** (*`float`*) – Floe radius during interactions [m]
- **`areal_radius`** (*`float`*) – Floe areal radius on the sea surface [m]. If not set, this parameter will equal the *contact_radius* value
- **`lin_vel`** (*`list or numpy.array`*) – Floe linear velocity [m/s]
- **`lin_acc`** (*`list or numpy.array`*) – Floe linear acceleration [m/s^2]
- **`force`** (*`list or numpy.array`*) – Sum of forces [N]
- **`ang_pos`** (*`float`*) – Floe angular position [rad]
- **`ang_vel`** (*`float`*) – Floe angular velocity [rad/s]
- **`ang_acc`** (*`float`*) – Floe angular acceleration [rad/s^2]
- **`torque`** (*`float`*) – Sum of forces [N]
- **`density`** (*`float`*) – Floe density [kg/m^3]
- **`rotating`** (*`bool`*) – The floe is free to rotate
- **`fixed`** (*`bool`*) – The floe is free to move linearly and/or rotationally

`find_accelerations`()

Determine current linear and angular accelerations based on the current sum of forces.

mass()

Determine the current floe mass.

Returns The floe mass based on its areal radius, thickness, and density.

Return type float

moment_of_inertia_vertical()

Determines the rotational moment of inertia for rotation around the floe center with a vertical rotation axis.

Returns The vertical rotational moment of inertia

Return type float

surface_area()

Determine the current floe surface area.

Returns The floe mass based on its areal radius.

Return type float

update_position(*dt*, *method='TY3'*)

Update the kinematics through explicit temporal integration using a third-order Taylor expansion.

Parameters

- **dt** (*float*) – The time step length
- **method** – The integration method to choose ('TY2' or 'TY3' (default))

update_position_TY2(*dt*)

Update the kinematics through explicit temporal integration of Newton's second law using a second-order Taylor expansion.

Parameters **dt** (*float*) – The time step length

update_position_TY3(*dt*)

Update the kinematics through explicit temporal integration of Newton's second law using a third-order Taylor expansion.

Parameters **dt** (*float*) – The time step length

volume()

Determine the current floe volume.

Returns The floe mass based on its areal radius, thickness.

Return type float

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