
Hyperloop Documentation

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1	hyperloop package	3
1.1	Subpackages	3
1.2	Module contents	7
2	Indices and tables	9
	Python Module Index	11

Contents:

hyperloop package

Subpackages

hyperloop.Hardware package

Module contents

hyperloop.Meshing package

Module contents

hyperloop.Python package

Subpackages

hyperloop.Python.mission package

Submodules

hyperloop.Python.mission.body_frame_acceleration module

hyperloop.Python.mission.eom module

hyperloop.Python.mission.lat_long module

hyperloop.Python.mission.mission_drag module

hyperloop.Python.mission.mission_thrust module

hyperloop.Python.mission.pod_thrust_and_drag module

hyperloop.Python.mission.rhs module

hyperloop.Python.mission.terrain module

hyperloop.Python.mission.usgs_data_converter module

Module contents

hyperloop.Python.pod package

Subpackages

hyperloop.Python.pod.cycle package

Submodules

hyperloop.Python.pod.cycle.comp_len module

hyperloop.Python.pod.cycle.compressor_mass module

hyperloop.Python.pod.cycle.cycle_group module

hyperloop.Python.pod.cycle.flow_path module

hyperloop.Python.pod.cycle.flow_path_inputs module

Module contents

hyperloop.Python.pod.drivetrain package

Subpackages

Submodules

hyperloop.Python.pod.drivetrain.battery module

hyperloop.Python.pod.drivetrain.drivetrain module

hyperloop.Python.pod.drivetrain.electric_motor module

hyperloop.Python.pod.drivetrain.inverter module

Module contents

hyperloop.Python.pod.magnetic_levitation package

Submodules

hyperloop.Python.pod.magnetic_levitation.breakpoint_levitation module

hyperloop.Python.pod.magnetic_levitation.levitation_group module

hyperloop.Python.pod.magnetic_levitation.magnetic_drag module

Module contents

Submodules

hyperloop.Python.pod.drag module

hyperloop.Python.pod.pod_geometry module

hyperloop.Python.pod.pod_group module

hyperloop.Python.pod.pod_mach module

hyperloop.Python.pod.pod_mass module

Module contents

hyperloop.Python.tools package

Submodules

hyperloop.Python.tools.io_helper module

```
class hyperloop.Python.tools.io_helper.InputHelper (file_name)  
    Bases: object  
    get_config (member)
```

Module contents

hyperloop.Python.tube package

Submodules

hyperloop.Python.tube.propulsion_mechanics module

hyperloop.Python.tube.steady_state_vacuum module

hyperloop.Python.tube.submerged_tube module

hyperloop.Python.tube.tube_and_pylon module

hyperloop.Python.tube.tube_group module

hyperloop.Python.tube.tube_power module

hyperloop.Python.tube.tube_vacuum module Current calculation to determine total number of vacuum pumps needed and their respective cost per year. The National average for Electricity runs \$.13 cents per kilowatt hour.

class `hyperloop.Python.tube.tube_vacuum.Vacuum`

Bases: `openmdao.core.component.Component`

Params `pressure_initial` : float

initial Pressure before the pump down . Default value is 760.2.

`pressure_final` : float

Desired pressure within tube. Default value is 7.0.

`speed` : float

Pumping speed. Default value is 163333.3.

`tube_area` : float

Area of the tube. Default value is 5.0.

`tube_length` : float

Length of the tube. Default value is 5000.0.

`pwr` : float

Motor rating. Default value is 18.5.

`electricity_price` : float

Cost of electricity per kilowatt hour. Default value is 0.13.

`time_down` : float

Desired pump down time. Default value is 300.0.

`gamma` : float

Operational percentage of the pump per day. Default value is 0.8.

`pump_weight` : float

Weight of one pump. Default value is 715.0.

Returns `number_pumps` : float

Number of pumps. Default value is 1.0.

`cost_annual` : float

Total cost of pumps. The cost of purchasing the pumps and running them per year in USD.

weight_tot: float

Total weight of the pumps throughout the track in kg.

pwr_tot: float

Total power of the pumps in kW.

energy_tot: float

Total energy consumed by the pumps in one day in kJ.

References

[1] Laughlin, Robert B., Prof. “Energy Information Administration - Electricity Price.” EIA. Stanford University, 30 Dec. 2008. Web. 24 June 2016. <<http://large.stanford.edu/publications/power/references/voltprice/>>
Umrath, Walter, Dr. Fundamentals of Vacuum Technology. N.p.: Oerlikon Leybold Vacuum, n.d. Print.

solve_nonlinear (*params, unknowns, resids*)

hyperloop.Python.tube.tube_wall_temp module

hyperloop.Python.tube.tunnel_cost module

Module contents

Submodules

hyperloop.Python.LIM module

hyperloop.Python.angular_velocity321 module

hyperloop.Python.boundary_layer_sensitivity module

hyperloop.Python.sample_mission module

hyperloop.Python.structural_optimization module

hyperloop.Python.ticket_cost module

hyperloop.Python.tube_and_pod module

hyperloop.Python.underwater_optimization module

Module contents

Module contents

Indices and tables

- `genindex`
- `modindex`
- `search`

h

- hyperloop, [7](#)
- hyperloop.Hardware, [3](#)
- hyperloop.Meshing, [3](#)
- hyperloop.Python, [7](#)
- hyperloop.Python.mission, [4](#)
- hyperloop.Python.pod, [5](#)
- hyperloop.Python.pod.cycle, [4](#)
- hyperloop.Python.pod.drivetrain, [4](#)
- hyperloop.Python.pod.magnetic_levitation,
[5](#)
- hyperloop.Python.tools, [5](#)
- hyperloop.Python.tools.io_helper, [5](#)
- hyperloop.Python.tube, [7](#)
- hyperloop.Python.tube.tube_vacuum, [6](#)

G

`get_config()` (`hyperloop.Python.tools.io_helper.InputHelper` method), 5

H

`hyperloop` (module), 7
`hyperloop.Hardware` (module), 3
`hyperloop.Meshing` (module), 3
`hyperloop.Python` (module), 7
`hyperloop.Python.mission` (module), 4
`hyperloop.Python.pod` (module), 5
`hyperloop.Python.pod.cycle` (module), 4
`hyperloop.Python.pod.drivetrain` (module), 4
`hyperloop.Python.pod.magnetic_levitation` (module), 5
`hyperloop.Python.tools` (module), 5
`hyperloop.Python.tools.io_helper` (module), 5
`hyperloop.Python.tube` (module), 7
`hyperloop.Python.tube.tube_vacuum` (module), 6

I

`InputHelper` (class in `hyperloop.Python.tools.io_helper`), 5

S

`solve_nonlinear()` (`hyperloop.Python.tube.tube_vacuum.Vacuum` method), 7

V

`Vacuum` (class in `hyperloop.Python.tube.tube_vacuum`), 6