rmf_battery

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CONTENTS:

A package for managing batteries in OpenRMF.

CHAPTER

ONE

RMF_BATTERY API

1.1 Class Hierarchy

1.2 File Hierarchy

1.3 Full API

1.3.1 Namespaces

Namespace rmf_battery

Contents

Namespaces

Classes

Typedefs

- *Typedef rmf_battery::ConstDevicePowerSinkPtr*
- *Typedef rmf_battery::ConstMotionPowerSinkPtr*
- *Typedef rmf_battery::DevicePowerSinkPtr*
- *Typedef rmf_battery::MotionPowerSinkPtr*

Namespace rmf_battery::agv

Contents

Classes

- *Class BatterySystem*
- *Class MechanicalSystem*
- *Class PowerSystem*
- *Class SimpleDevicePowerSink*
- *Class SimpleMotionPowerSink*

Typedefs

- *Typedef rmf_battery::agv::BatterySystemPtr*
- *Typedef rmf_battery::agv::ConstBatterySystemPtr*
- *Typedef rmf_battery::agv::ConstMechanicalSystemPtr*
- *Typedef rmf_battery::agv::ConstPowerSystemPtr*
- *Typedef rmf_battery::agv::MechanicalSystemPtr*
- *Typedef rmf_battery::agv::PowerSystemPtr*

1.3.2 Classes and Structs

Class BatterySystem

- Defined in file_latest_rmf_battery_include_rmf_battery_agv_BatterySystem.hpp

Class Documentation

class rmf_battery::agv::**BatterySystem**

Public Functions

double **nominal_voltage**() **const**
Get the nominal voltage of this battery system.

double **capacity**() **const**
Get the capacity of this battery system.

double **charging_current**() **const**
Get the charging current of this battery system.

Public Static Functions

static std::optional<*BatterySystem*> **make**(double *nominal_voltage*, double *capacity*, double *charging_current*)
Returns a *BatterySystem* object if valid values were supplied for the various fields else returns std::nullopt. Here valid implies that the values are greater than zero.

Parameters

- [in] nominal_voltage: The nominal voltage of the battery in Volts
- [in] capacity: The nominal capacity of the battery in Ampere-hours
- [in] charging_current: The rated current in Amperes for charging the battery

Class MechanicalSystem

- Defined in file_latest_rmf_battery_include_rmf_battery_agv_MechanicalSystem.hpp

Class Documentation

class rmf_battery::agv::**MechanicalSystem**

Public Functions

double **mass**() **const**
Get the mass of this mechanical system.

double **moment_of_inertia**() **const**
Get the moment of inertia of this mechanical system.

double **friction_coefficient**() **const**
Get the friction coefficient of this mechanical system.

Public Static Functions

static std::optional<*MechanicalSystem*> **make**(double *mass*, double *moment_of_inertia*, double *friction_coefficient*)

Returns a *MechanicalSystem* object if valid values were supplied for the various fields else returns std::nullopt. Here valid implies that the values are greater than zero.

Parameters

- `[in] mass`: The mass of the robot in Kilograms(kg)
- `[in] moment_of_inertia`: The moment of inertia of the robot along its yaw axis in kg.m^2
- `[in] friction_coefficient`: The coefficient of kinetic friction or rolling resistance coefficient measured at the wheels of the robot. This value is used to compute the energy loss due to rotation of the vehicle's wheels during locomotion. This value is the dimensionless constant Crr as described in the reference below. Ref: https://en.wikipedia.org/wiki/Rolling_resistance#Rolling_resistance_coefficient

Class PowerSystem

- Defined in file_latest_rmf_battery_include_rmf_battery_agv_PowerSystem.hpp

Class Documentation

class `rmf_battery::agv::`**PowerSystem**

Public Functions

double **nominal_power**() **const**

Get the nominal power of this power system.

Public Static Functions

static std::optional<*PowerSystem*> **make**(double *nominal_power*)

Returns a *PowerSystem* object if valid values were supplied for the various fields else returns std::nullopt. Here valid implies that the values are greater than zero.

Parameters

- `[in] nominal_power`: The rated nominal power consumption in Watts for this power system

Class SimpleDevicePowerSink

- Defined in file_latest_rmf_battery_include_rmf_battery_agv_SimpleDevicePowerSink.hpp

Inheritance Relationships

Base Type

- `public rmf_battery::DevicePowerSink` (*Class DevicePowerSink*)

Class Documentation

class `rmf_battery::agv::`**SimpleDevicePowerSink** : **public** rmf_battery::*DevicePowerSink*

Public Functions

SimpleDevicePowerSink(**const** *BatterySystem* &*battery_system*, **const** *PowerSystem* &*power_system*)

Constructor

Parameters

- `[in] battery_system`: The *BatterySystem* of the robot
- `[in] power_system`: The *PowerSystem* for this device

const *BatterySystem* &**battery_system**() **const**

Get a constant reference to the battery system.

const *PowerSystem* &**power_system**() **const**

Get a constant reference to the power system.

virtual double **compute_change_in_charge**(**const** double *run_time*) **const final**

Compute change in state-of-charge of the battery due to an onboard device over a time period.

Return The charge depleted as a fraction of the total battery capacity

Parameters

- `[in] run_time`: The duration in seconds over which the power system drains charge from the battery

Class SimpleMotionPowerSink

- Defined in file_latest_rmf_battery_include_rmf_battery_agv_SimpleMotionPowerSink.hpp

Inheritance Relationships

Base Type

- `public rmf_battery::MotionPowerSink` (*Class MotionPowerSink*)

Class Documentation

class rmf_battery::agv::**SimpleMotionPowerSink** : **public** rmf_battery::*MotionPowerSink*

Public Functions

SimpleMotionPowerSink(**const** *BatterySystem* &*battery_system*, **const** *MechanicalSystem* &*mechanical_system*)

Constructor

Parameters

- [in] battery_system: The *BatterySystem* of the robot
- [in] mechanical_system: The *MechanicalSystem* of the robot

const *BatterySystem* &**battery_system**() **const**

Get a constant reference to the battery system.

const *MechanicalSystem* &**mechanical_system**() **const**

Get a constant reference to the mechanical system.

virtual double **compute_change_in_charge**(**const** rmf_traffic::Trajectory &*trajectory*) **const final**

Compute change in state-of-charge estimate of battery due to locomotion of the robot along a trajectory.

Return The charge depleted as a fraction of the total battery capacity

Parameters

- [in] trajectory: A valid rmf_traffic:::Trajectory over which the change in charge has to to be computed

Class DevicePowerSink

- Defined in file_latest_rmf_battery_include_rmf_battery_DevicePowerSink.hpp

Inheritance Relationships

Derived Type

- public rmf_battery::agv::SimpleDevicePowerSink (*Class SimpleDevicePowerSink*)

Class Documentation

class rmf_battery::**DevicePowerSink**
Subclassed by *rmf_battery::agv::SimpleDevicePowerSink*

Public Functions

virtual double **compute_change_in_charge**(**const** double *run_time*) **const** = 0
Compute change in state-of-charge of the battery due to an onboard device over a time period.

Return The charge depleted as a fraction of the total battery capacity

Parameters

- [in] run_time: The duration in seconds over which the power system drains charge from the battery

virtual **~DevicePowerSink**() = default

Class MotionPowerSink

- Defined in file_latest_rmf_battery_include_rmf_battery_MotionPowerSink.hpp

Inheritance Relationships

Derived Type

- public rmf_battery::agv::SimpleMotionPowerSink (*Class SimpleMotionPowerSink*)

Class Documentation

class rmf_battery::**MotionPowerSink**
Subclassed by *rmf_battery::agv::SimpleMotionPowerSink*

Public Functions

virtual double **compute_change_in_charge**(**const** rmf_traffic::Trajectory &*trajectory*) **const** = 0
Compute change in state-of-charge of the battery due to locomotion of the robot along a trajectory.

Return The charge depleted as a fraction of the total battery capacity

Parameters

- [in] trajectory: A valid rmf_traffic:::Trajectory over which the change in charge has to to be computed

virtual **~MotionPowerSink**() = default

1.3.3 Typedefs

Typedef rmf_battery::agv::BatterySystemPtr

- Defined in file_latest_rmf_battery_include_rmf_battery_agv_BatterySystem.hpp

Typedef Documentation

using rmf_battery::agv::**BatterySystemPtr** = std::shared_ptr<*BatterySystem*>

Typedef rmf_battery::agv::ConstBatterySystemPtr

- Defined in file_latest_rmf_battery_include_rmf_battery_agv_BatterySystem.hpp

Typedef Documentation

using rmf_battery::agv::**ConstBatterySystemPtr** = std::shared_ptr<**const** *BatterySystem*>

Typedef rmf_battery::agv::ConstMechanicalSystemPtr

- Defined in file_latest_rmf_battery_include_rmf_battery_agv_MechanicalSystem.hpp

Typedef Documentation

using rmf_battery::agv::**ConstMechanicalSystemPtr** = std::shared_ptr<**const** *MechanicalSystem*>

Typedef rmf_battery::agv::ConstPowerSystemPtr

- Defined in file_latest_rmf_battery_include_rmf_battery_agv_PowerSystem.hpp

Typedef Documentation

using rmf_battery::agv::**ConstPowerSystemPtr** = std::shared_ptr<**const** *PowerSystem*>

Typedef rmf_battery::agv::MechanicalSystemPtr

- Defined in file_latest_rmf_battery_include_rmf_battery_agv_MechanicalSystem.hpp

Typedef Documentation

using rmf_battery::agv::**MechanicalSystemPtr** = std::shared_ptr<*MechanicalSystem*>

Typedef rmf_battery::agv::PowerSystemPtr

- Defined in file_latest_rmf_battery_include_rmf_battery_agv_PowerSystem.hpp

Typedef Documentation

using rmf_battery::agv::**PowerSystemPtr** = std::shared_ptr<*PowerSystem*>

Typedef rmf_battery::ConstDevicePowerSinkPtr

- Defined in file_latest_rmf_battery_include_rmf_battery_DevicePowerSink.hpp

Typedef Documentation

using rmf_battery::**ConstDevicePowerSinkPtr** = std::shared_ptr<**const** *DevicePowerSink*>

Typedef rmf_battery::ConstMotionPowerSinkPtr

- Defined in file_latest_rmf_battery_include_rmf_battery_MotionPowerSink.hpp

Typedef Documentation

using rmf_battery::**ConstMotionPowerSinkPtr** = std::shared_ptr<**const** *MotionPowerSink*>

Typedef rmf_battery::DevicePowerSinkPtr

- Defined in file_latest_rmf_battery_include_rmf_battery_DevicePowerSink.hpp

Typedef Documentation

using rmf_battery::**DevicePowerSinkPtr** = std::shared_ptr<*DevicePowerSink*>

Typedef rmf_battery::MotionPowerSinkPtr

- Defined in file_latest_rmf_battery_include_rmf_battery_MotionPowerSink.hpp

Typedef Documentation

using rmf_battery::**MotionPowerSinkPtr** = std::shared_ptr<*MotionPowerSink*>

INDEX

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