Qpos

Controlador

Asignación del manejador del controlador

keyboard

['B\_colind', 'B\_rowadr', 'B\_rownnz', 'C\_colind', 'C\_rowadr', 'C\_rownnz', 'D\_colind', 'D\_rowadr', 'D\_rownnz', '\_\_class\_\_', '\_\_copy\_\_', '\_\_deepcopy\_\_', '\_\_delattr\_\_', '\_\_dir\_\_', '\_\_doc\_\_', '\_\_eq\_\_', '\_\_format\_\_', '\_\_ge\_\_', '\_\_getattribute\_\_', '\_\_getstate\_\_', '\_\_gt\_\_', '\_\_hash\_\_', '\_\_init\_\_', '\_\_init\_subclass\_\_', '\_\_le\_\_', '\_\_lt\_\_', '\_\_module\_\_', '\_\_ne\_\_', '\_\_new\_\_', '\_\_reduce\_\_', '\_\_reduce\_ex\_\_', '\_\_repr\_\_', '\_\_setattr\_\_', '\_\_setstate\_\_', '\_\_sizeof\_\_', '\_\_str\_\_', '\_\_subclasshook\_\_', '\_address', '\_pybind11\_conduit\_v1\_', 'act', 'act\_dot', 'actuator', 'actuator\_force', 'actuator\_length', 'actuator\_moment', 'actuator\_velocity', 'bind', 'body', 'bvh\_aabb\_dyn', 'bvh\_active', 'cacc', 'cam', 'cam\_xmat', 'cam\_xpos', 'camera', 'cdof', 'cdof\_dot', 'cfrc\_ext', 'cfrc\_int', 'cinert', 'contact', 'crb', 'ctrl', 'cvel', 'dof\_island', 'dof\_islandind', 'efc\_AR', 'efc\_AR\_colind', 'efc\_AR\_rowadr', 'efc\_AR\_rownnz', 'efc\_D', 'efc\_J', 'efc\_JT', 'efc\_JT\_colind', 'efc\_JT\_rowadr', 'efc\_JT\_rownnz', 'efc\_JT\_rowsuper', 'efc\_J\_colind', 'efc\_J\_rowadr', 'efc\_J\_rownnz', 'efc\_J\_rowsuper', 'efc\_KBIP', 'efc\_R', 'efc\_aref', 'efc\_b', 'efc\_diagApprox', 'efc\_force', 'efc\_frictionloss', 'efc\_id', 'efc\_island', 'efc\_margin', 'efc\_pos', 'efc\_state', 'efc\_type', 'efc\_vel', 'energy', 'eq\_active', 'flexedge\_J', 'flexedge\_J\_colind', 'flexedge\_J\_rowadr', 'flexedge\_J\_rownnz', 'flexedge\_length', 'flexedge\_velocity', 'flexelem\_aabb', 'flexvert\_xpos', 'geom', 'geom\_xmat', 'geom\_xpos', 'island\_dofadr', 'island\_dofind', 'island\_dofnum', 'island\_efcadr', 'island\_efcind', 'island\_efcnum', 'jnt', 'joint', 'light', 'light\_xdir', 'light\_xpos', 'mapD2M', 'mapM2C', 'mapM2D', 'maxuse\_arena', 'maxuse\_con', 'maxuse\_efc', 'maxuse\_stack', 'maxuse\_threadstack', 'mocap\_pos', 'mocap\_quat', 'model', 'moment\_colind', 'moment\_rowadr', 'moment\_rownnz', 'nJ', 'narena', 'nbuffer', 'ncon', 'ne', 'nefc', 'nf', 'nisland', 'nl', 'nplugin', 'parena', 'pbase', 'plugin', 'plugin\_data', 'plugin\_state', 'pstack', 'qDeriv', 'qH', 'qHDiagInv', 'qLD', 'qLDiagInv', 'qLDiagSqrtInv', 'qLU', 'qM', 'qacc', 'qacc\_smooth', 'qacc\_warmstart', 'qfrc\_actuator', 'qfrc\_applied', 'qfrc\_bias', 'qfrc\_constraint', 'qfrc\_damper', 'qfrc\_fluid', 'qfrc\_gravcomp', 'qfrc\_inverse', 'qfrc\_passive', 'qfrc\_smooth', 'qfrc\_spring', 'qpos', 'qvel', 'sensor', 'sensordata', 'site', 'site\_xmat', 'site\_xpos', 'solver', 'solver\_fwdinv', 'solver\_nisland', 'solver\_niter', 'solver\_nnz', 'subtree\_angmom', 'subtree\_com', 'subtree\_linvel', 'ten', 'ten\_J', 'ten\_J\_colind', 'ten\_J\_rowadr', 'ten\_J\_rownnz', 'ten\_length', 'ten\_velocity', 'ten\_wrapadr', 'ten\_wrapnum', 'tendon', 'tendon\_efcadr', 'threadpool', 'time', 'timer', 'userdata', 'warning', 'wrap\_obj', 'wrap\_xpos', 'xanchor', 'xaxis', 'xfrc\_applied', 'ximat', 'xipos', 'xmat', 'xpos', 'xquat']

class MjData(pybind11\_builtins.pybind11\_object)

| Method resolution order:

| MjData

| pybind11\_builtins.pybind11\_object

| builtins.object

|

| Methods defined here:

|

| \_\_copy\_\_(...)

| \_\_copy\_\_(self: mujoco.\_structs.MjData) -> mujoco.\_structs.MjData

|

| \_\_deepcopy\_\_(...)

| \_\_deepcopy\_\_(self: mujoco.\_structs.MjData, arg0: dict) -> mujoco.\_structs.MjData

|

| \_\_getstate\_\_(...)

| \_\_getstate\_\_(self: mujoco.\_structs.MjData) -> bytes

|

| \_\_init\_\_(...)

| \_\_init\_\_(self: mujoco.\_structs.MjData, arg0: mujoco.\_structs.MjModel) -> None

|

| \_\_setstate\_\_(...)

| \_\_setstate\_\_(self: mujoco.\_structs.MjData, arg0: bytes) -> None

| actuator(...)

| actuator(\*args, \*\*kwargs)

| Overloaded function.

|

| 1. actuator(self: mujoco.\_structs.MjData, arg0: int) -> mujoco::python::MjDataActuatorViews

|

| 2. actuator(self: mujoco.\_structs.MjData, name: str = '') -> mujoco::python::MjDataActuatorViews

|

| bind(...)

| bind(\*args, \*\*kwargs)

| Overloaded function.

|

| 1. bind(self: mujoco.\_structs.MjData, spec: mjsActuator\_ = None) -> mujoco::python::MjDataActuatorViews

|

| 2. bind(self: mujoco.\_structs.MjData, spec: mjsBody\_ = None) -> mujoco::python::MjDataBodyViews

|

| 3. bind(self: mujoco.\_structs.MjData, spec: mjsCamera\_ = None) -> mujoco::python::MjDataCameraViews

|

| 4. bind(self: mujoco.\_structs.MjData, spec: mjsGeom\_ = None) -> mujoco::python::MjDataGeomViews

|

| 5. bind(self: mujoco.\_structs.MjData, spec: mjsJoint\_ = None) -> mujoco::python::MjDataJointViews

|

| 6. bind(self: mujoco.\_structs.MjData, spec: mjsLight\_ = None) -> mujoco::python::MjDataLightViews

|

| 7. bind(self: mujoco.\_structs.MjData, spec: mjsSensor\_ = None) -> mujoco::python::MjDataSensorViews

|

| 8. bind(self: mujoco.\_structs.MjData, spec: mjsSite\_ = None) -> mujoco::python::MjDataSiteViews

|

| 9. bind(self: mujoco.\_structs.MjData, spec: mjsTendon\_ = None) -> mujoco::python::MjDataTendonViews

|

| body(...)

| body(\*args, \*\*kwargs)

| Overloaded function.

|

| 1. body(self: mujoco.\_structs.MjData, arg0: int) -> mujoco::python::MjDataBodyViews

|

| 2. body(self: mujoco.\_structs.MjData, name: str = '') -> mujoco::python::MjDataBodyViews

|

| cam(...)

| cam(\*args, \*\*kwargs)

| Overloaded function.

|

| 1. cam(self: mujoco.\_structs.MjData, arg0: int) -> mujoco::python::MjDataCameraViews

|

| 2. cam(self: mujoco.\_structs.MjData, name: str = '') -> mujoco::python::MjDataCameraViews

| camera(...)

| camera(\*args, \*\*kwargs)

| Overloaded function.

|

| 1. camera(self: mujoco.\_structs.MjData, arg0: int) -> mujoco::python::MjDataCameraViews

|

| 2. camera(self: mujoco.\_structs.MjData, name: str = '') -> mujoco::python::MjDataCameraViews

|

| geom(...)

| geom(\*args, \*\*kwargs)

| Overloaded function.

|

| 1. geom(self: mujoco.\_structs.MjData, arg0: int) -> mujoco::python::MjDataGeomViews

|

| 2. geom(self: mujoco.\_structs.MjData, name: str = '') -> mujoco::python::MjDataGeomViews

|

| jnt(...)

| jnt(\*args, \*\*kwargs)

| Overloaded function.

|

| 1. jnt(self: mujoco.\_structs.MjData, arg0: int) -> mujoco::python::MjDataJointViews

|

| 2. jnt(self: mujoco.\_structs.MjData, name: str = '') -> mujoco::python::MjDataJointViews

|

| joint(...)

| joint(\*args, \*\*kwargs)

| Overloaded function.

|

| 1. joint(self: mujoco.\_structs.MjData, arg0: int) -> mujoco::python::MjDataJointViews

|

| 2. joint(self: mujoco.\_structs.MjData, name: str = '') -> mujoco::python::MjDataJointViews

|

| light(...)

| light(\*args, \*\*kwargs)

| Overloaded function.

|

| 1. light(self: mujoco.\_structs.MjData, arg0: int) -> mujoco::python::MjDataLightViews

|

| 2. light(self: mujoco.\_structs.MjData, name: str = '') -> mujoco::python::MjDataLightViews

|

| sensor(...)

| sensor(\*args, \*\*kwargs)

| Overloaded function.

|

| 1. sensor(self: mujoco.\_structs.MjData, arg0: int) -> mujoco::python::MjDataSensorViews

|

| 2. sensor(self: mujoco.\_structs.MjData, name: str = '') -> mujoco::python::MjDataSensorViews

site(...)

| site(\*args, \*\*kwargs)

| Overloaded function.

|

| 1. site(self: mujoco.\_structs.MjData, arg0: int) -> mujoco::python::MjDataSiteViews

|

| 2. site(self: mujoco.\_structs.MjData, name: str = '') -> mujoco::python::MjDataSiteViews

|

| ten(...)

| ten(\*args, \*\*kwargs)

| Overloaded function.

|

| 1. ten(self: mujoco.\_structs.MjData, arg0: int) -> mujoco::python::MjDataTendonViews

|

| 2. ten(self: mujoco.\_structs.MjData, name: str = '') -> mujoco::python::MjDataTendonViews

|

| tendon(...)

| tendon(\*args, \*\*kwargs)

| Overloaded function.

|

| 1. tendon(self: mujoco.\_structs.MjData, arg0: int) -> mujoco::python::MjDataTendonViews

|

| 2. tendon(self: mujoco.\_structs.MjData, name: str = '') -> mujoco::python::MjDataTendonViews

|

| ----------------------------------------------------------------------

| Readonly properties defined here:

|

| contact

|

| dof\_island

|

| dof\_islandind

|

| efc\_AR

|

| efc\_AR\_colind

|

| efc\_AR\_rowadr

|

| efc\_AR\_rownnz

|

| efc\_D

|

| efc\_J

|

| efc\_JT

|

| efc\_JT\_colind

|

| efc\_JT\_rowadr

|

| efc\_JT\_rownnz

|

| efc\_JT\_rowsuper

|

| efc\_J\_colind

|

| efc\_J\_rowadr

|

| efc\_J\_rownnz

|

| efc\_J\_rowsuper

|

| efc\_KBIP

|

| efc\_R

|

| efc\_aref

|

| efc\_b

|

| efc\_diagApprox

|

| efc\_force

|

| efc\_frictionloss

|

| efc\_id

|

| efc\_island

|

| efc\_margin

|

| efc\_pos

|

| efc\_state

|

| efc\_type

|

| efc\_vel

|

| island\_dofadr

|

| island\_dofind

|

| island\_dofnum

| island\_efcadr

|

| island\_efcind

|

| island\_efcnum

|

| model

|

| solver

|

| tendon\_efcadr

|

| timer

|

| warning

|

| ----------------------------------------------------------------------

| Data descriptors defined here:

|

| B\_colind

|

| B\_rowadr

|

| B\_rownnz

|

| C\_colind

|

| C\_rowadr

|

| C\_rownnz

|

| D\_colind

|

| D\_rowadr

|

| D\_rownnz

|

| act

|

| act\_dot

|

| actuator\_force

|

| actuator\_length

|

| actuator\_moment

|

| actuator\_velocity

|

| bvh\_aabb\_dyn

|

| bvh\_active

|

| cacc

|

| cam\_xmat

|

| cam\_xpos

|

| cdof

|

| cdof\_dot

|

| cfrc\_ext

|

| cfrc\_int

|

| cinert

|

| crb

|

| ctrl

|

| cvel

|

| energy

|

| eq\_active

|

| flexedge\_J

|

| flexedge\_J\_colind

|

| flexedge\_J\_rowadr

|

| flexedge\_J\_rownnz

|

| flexedge\_length

|

| flexedge\_velocity

|

| flexelem\_aabb

|

| flexvert\_xpos

|

| geom\_xmat

|

| geom\_xpos

|

| light\_xdir

|

| light\_xpos

|

| mapD2M

|

| mapM2C

|

| mapM2D

|

| maxuse\_arena

|

| maxuse\_con

|

| maxuse\_efc

|

| maxuse\_stack

|

| maxuse\_threadstack

|

| mocap\_pos

|

| mocap\_quat

|

| moment\_colind

|

| moment\_rowadr

|

| moment\_rownnz

|

| nJ

|

| narena

|

| nbuffer

|

| ncon

|

| ne

|

| nefc

|

| nf

|

| nisland

|

| nl

|

| nplugin

|

| parena

|

| pbase

|

| plugin

|

| plugin\_data

|

| plugin\_state

|

| pstack

|

| qDeriv

|

| qH

|

| qHDiagInv

|

| qLD

|

| qLDiagInv

|

| qLDiagSqrtInv

|

| qLU

|

| qM

|

| qacc

|

| qacc\_smooth

|

| qacc\_warmstart

|

| qfrc\_actuator

|

| qfrc\_applied

|

| qfrc\_bias

|

| qfrc\_constraint

|

| qfrc\_damper

|

| qfrc\_fluid

|

| qfrc\_gravcomp

|

| qfrc\_inverse

|

| qfrc\_passive

|

| qfrc\_smooth

|

| qfrc\_spring

|

| qpos

|

| qvel

|

| sensordata

|

| site\_xmat

|

| site\_xpos

|

| solver\_fwdinv

|

| solver\_nisland

|

| solver\_niter

|

| solver\_nnz

|

| subtree\_angmom

|

| subtree\_com

|

| subtree\_linvel

|

| ten\_J

|

| ten\_J\_colind

|

| ten\_J\_rowadr

|

| ten\_J\_rownnz

|

| ten\_length

|

| ten\_velocity

|

| ten\_wrapadr

|

| ten\_wrapnum

|

| threadpool

|

| time

|

| userdata

|

| wrap\_obj

|

| wrap\_xpos

|

| xanchor

|

| xaxis

|

| xfrc\_applied

|

| ximat

|

| xipos

|

| xmat

|

| xpos

|

| xquat

|

| ----------------------------------------------------------------------

| Static methods inherited from pybind11\_builtins.pybind11\_object:

|

| \_\_new\_\_(\*args, \*\*kwargs) class method of pybind11\_builtins.pybind11\_object

| Create and return a new object. See help(type) for accurate signature.

Parametros del robot

### Control del robot

Ctrl: Array que contiene los valores actuales de los **controles** enviados a los actuadores (Torques, fuerzas, o posiciones de referencia) -> Modificar este valor para controlar directamente el robot

actuator\_force: Fuerzas actuales generadas por los actuadores -> Observar qué fuerzas están aplicando los actuadores en cada instante

actuator\_length: Longitudes actuales de los actuadores -> desplazamiento físico de actuadores lineales o similares

actuator\_velocity: Velocidades de los actuadores

actuator\_moment: Momento generado por los actuadores en función de la configuración actual

### Estado de las articulaciones joint: estado dinámico

Qpos: Posiciones generales del sistema

Qvel: Velocidades angulares o lineales de las articulaciones

Qacc: Aceleraciones de las articulaciones

qfrc\_applied: Fuerzas externas aplicadas directamente a las articulaciones

qfrc\_constraint: Fuerzas generadas por restricciones en las articulaciones

### Sensores

Sensordata: Valores actuales de todos los sensores del modelo

Sensor: sensores específicos

### cinemática del modelo

Xpos: Posiciones globales de los cuerpos del modelo

Xmat: Matrices de rotación de los cuerpos en el espacio global

Xquat: Orientaciones en forma de cuaterniones -> Calcular rotaciones y transformaciones

### Información sobre contactos

Contact: contactos detectados en la simulación

cfrc\_ext: Fuerzas externas aplicadas a los cuerpos del modelo debido a contactos

### Parámetros temporales

Time: tiempo actual en la simulación

### parámetros utiles

cam\_xpos y cam\_xmat: Posición y orientación de las cámaras

energy: Energía cinética y potencial del modelo -> monitorear consumo de energía del robot