

VREP

V-REP simulator communications object

A VREP object holds all information related to the state of a connection. References are passed to other objects which mirror the V-REP environment in MATLAB.

This class handles the interface to the simulator and low-level object handle operations.

Methods throw exception if an error occurs.

Methods

gethandle	get handle to named object
getchildren	get children belonging to handle
object	return a VREP_obj object for named object
arm	return a VREP_arm object for named robot
camera	return a VREP_camera object for named vision sensor
hokuyo	return a VREP_hokuyo object for named Hokuyo scanner
getpos	return position of object given handle
setpos	set position of object given handle
getorient	return orientation of object given handle
setorient	set orientation of object given handle
getpose	return pose of object given handle
setpose	set pose of object given handle
setobjparam_bool	set object boolean parameter
setobjparam_int	set object integer parameter
setobjparam_float	set object float parameter
getobjparam_bool	get object boolean parameter
getobjparam_int	get object integer parameter
getobjparam_float	get object float parameter
signal_int	send named integer signal
signal_float	send named float signal
signal_str	send named string signal
setparam_bool	set object boolean parameter
setparam_int	set object integer parameter
setparam_float	set object float parameter
delete	shutdown the connection and cleanup
startsim	start the simulator running
stopsim	stop the simulator running
pausesim	pause the simulator
getversion	get V-REP version number
checkcomms	return status of connection
pausecomms	pause the comms
display	print the link parameters in human readable form
char	convert to string

See also

[vrep_obj](#), [vrep_arm](#), [vrep_camera](#), [vrep_hokuyo](#)

VREP.VREP

VREP object constructor

`v = VREP(options)` create a connection to the V-REP simulator.

`v = VREP(path, options)` as above but specify the root directory of V-REP.

Options

'version', V	Version of V-REP, V=304, 311 etc
'timeout', T	Timeout T in ms (default 2000)
'cycle', C	Cycle time C in ms (default 5)
'port', P	Override communications port
'reconnect'	Reconnect on error (default noreconnect)

VREP.arm

Return VREP_arm object

`V.arm(name)` is a factory method that returns a `VREP_arm` object for the V-REP robot object named NAME.

See also

[vrep_arm](#)

VREP.camera

Return VREP_camera object

`V.camera(name)` is a factory method that returns a `VREP_camera` object for the V-REP vision sensor object named NAME.

See also

[vrep_camera](#)

VREP.checkcomms

Check communications to V-REP simulator

`V.checkcomms()` is true if a valid connection to the V-REP simulator exists.

VREP.delete

VREP object destructor

`delete(v)` closes the connection to the V-REP simulator

VREP.getchildren

Return children of object

`C = V.getchildren(H)` is a vector of integer handles for the V-REP object denoted by the integer handle `H`.

VREP.gethandle

Return handle to VREP object

`H = V.gethandle(name)` is an integer handle for named V-REP object.

`H = V.gethandle(fmt, arglist)` as above but the name is formed from `sprintf(fmt, arglist)`.

VREP.getjoint

Get value of V-REP joint object

`V.getjoint(H, q)` is the position of joint object with integer handle `H`.

VREP.getobjparam_bool

get boolean parameter of a V-REP object

V.getobjparam_bool(**H**, **param**) gets the boolean parameter with identifier **param** of object with integer handle **H**.

VREP.getobjparam_float

get float parameter of a V-REP object

V.getobjparam_float(**H**, **param**) gets the float parameter with identifier **param** of object with integer handle **H**.

VREP.getobjparam_int

get Integer parameter of a V-REP object

V.getobjparam_int(**H**, **param**) gets the integer parameter with identifier **param** of object with integer handle **H**.

VREP.getorient

Get orientation of V-REP object

V.getorient(**H**) is the orientation as a rotation matrix (3×3) of the V-REP object with integer handle **H**.

V.getorient(**H**, 'euler', **OPTIONS**) as above but returns ZYZ Euler angles.

V.getorient(**H**, **hrr**) as above but orientation is relative to the position of object with integer handle **HR**.

V.getorient(**H**, **hrr**, 'euler', **OPTIONS**) as above but returns ZYZ Euler angles.

Options

See tr2eul.

VREP.getpos

Get position of V-REP object

V.getpos(**H**) is the position (1×3) of the V-REP object with integer handle **H**.

V.getpos(**H**, **hr**) as above but position is relative to the position of object with integer handle **hr**.

VREP.getpose

Get pose of V-REP object

V.getpose(**H**) is the pose (4×4) of the V-REP object with integer handle **H**.

V.getpose(**H**, **hr**) as above but pose is relative to the pose of object with integer handle **R**.

VREP.getversion

Get version of the V-REP simulator

V.getversion() is the version of the V-REP simulator server as an integer MNNNN where M is the major version number and NNNN is the minor version number.

VREP.hokuyo

Return VREP_hokuyo object

V.hokuyo(**name**) is a factory method that returns a VREP_hokuyo object for the V-REP Hokuyo laser scanner object named **NAME**.

See also

[vrep_hokuyo](#)

VREP.mobile

Return VREP_mobile object

V.**mobile**(**name**) is a factory method that returns a VREP_mobile object for the V-REP **mobile** base object named NAME.

See also

[vrep_mobile](#)

VREP.object

Return VREP_obj object

V.**object**(**name**) is a factory method that returns a VREP_obj object for the V-REP object named NAME.

See also

[vrep_obj](#)

VREP.pausecomms

Pause communications to the V-REP simulator

V.**pausecomms**(**p**) pauses communications to the V-REP simulation engine if **p** is true else resumes it. Useful to ensure an atomic update of simulator state.

VREP.setjoint

Set value of V-REP joint object

V.**setjoint**(**H**, **q**) sets the position of joint object with integer handle **H** to the value **q**.

VREP.setjointtarget

Set target value of V-REP joint object

V.**setjointtarget**(**H**, **q**) sets the target position of joint object with integer handle **H** to the value **q**.

VREP.setjointvel

Set velocity of V-REP joint object

V.**setjointvel**(**H**, **q_d**) sets the target velocity of joint object with integer handle **H** to the value **q_d**.

VREP.setobjparam_bool

Set boolean parameter of a V-REP object

V.**setobjparam_bool**(**H**, **param**, **val**) sets the boolean parameter with identifier **param** of object **H** to value **val**.

VREP.setobjparam_float

Set float parameter of a V-REP object

V.**setobjparam_float**(**H**, **param**, **val**) sets the float parameter with identifier **param** of object **H** to value **val**.

VREP.setobjparam_int

Set Integer parameter of a V-REP object

V.**setobjparam_int**(**H**, **param**, **val**) sets the integer parameter with identifier **param** of object **H** to value **val**.

VREP.setorient

Set orientation of V-REP object

V.setorient(**H**, **R**) sets the orientation of V-REP object with integer handle **H** to that given by rotation matrix **R** (3×3).

V.setorient(**H**, **T**) sets the orientation of V-REP object with integer handle **H** to rotational component of homogeneous transformation matrix **T** (4×4).

V.setorient(**H**, **E**) sets the orientation of V-REP object with integer handle **H** to ZYZ Euler angles (1×3).

V.setorient(**H**, **x**, **hr**) as above but orientation is set relative to the orientation of object with integer handle **hr**.

VREP.setparam_bool

Set boolean parameter of the V-REP simulator

V.setparam_bool(**name**, **val**) sets the boolean parameter with name **name** to value **val** within the V-REP simulation engine.

VREP.setparam_float

Set float parameter of the V-REP simulator

V.setparam_float(**name**, **val**) sets the float parameter with name **name** to value **val** within the V-REP simulation engine.

VREP.setparam_int

Set integer parameter of the V-REP simulator

V.setparam_int(**name**, **val**) sets the integer parameter with name **name** to value **val** within the V-REP simulation engine.

VREP.setpos

Set position of V-REP object

V.setpos(**H**, **T**) sets the position of V-REP object with integer handle **H** to **T** (1×3).

V.setpos(**H**, **T**, **hr**) as above but position is set relative to the position of object with integer handle **hr**.

VREP.setpose

Set pose of V-REP object

V.setpos(**H**, **T**) sets the pose of V-REP object with integer handle **H** according to homogeneous transform **T** (4×4).

V.setpos(**H**, **T**, **hr**) as above but pose is set relative to the pose of object with integer handle **hr**.

VREP.signal_float

Send a float signal to the V-REP simulator

V.signal_float(**name**, **val**) send a float signal with name **name** and value **val** to the V-REP simulation engine.

VREP.signal_int

Send an integer signal to the V-REP simulator

V.signal_int(**name**, **val**) send an integer signal with name **name** and value **val** to the V-REP simulation engine.

VREP.signal_str

Send a string signal to the V-REP simulator

V.signal_str(**name**, **val**) send a string signal with name **name** and value **val** to the V-REP simulation engine.

VREP.simpause

Pause V-REP simulation

V.**simpause**() pauses the V-REP simulation engine. Use V.simstart() to resume the simulation.

See also

[VREP.simstart](#)

VREP.simstart

Start V-REP simulation

V.**simstart**() starts the V-REP simulation engine.

See also

[VREP.simstop](#), [VREP.simpause](#)

VREP.simstop

Stop V-REP simulation

V.**simstop**() stops the V-REP simulation engine.

See also

[VREP.simstart](#)

VREP.youbot

Return VREP_youbot object

V.**youbot**(name) is a factory method that returns a VREP_youbot object for the V-REP YouBot object named NAME.

See also

[vrep_youbot](#)

VREP_arm

V-REP mirror of robot arm object

Mirror objects are MATLAB objects that reflect objects in the V-REP environment. Methods allow the V-REP state to be examined or changed.

This is a concrete class, derived from VREP_mirror, for all V-REP robot arm objects and allows access to joint variables.

Methods throw exception if an error occurs.

Example

```
vrep = VREP();  
arm = vrep.arm('IRB140');  
q = arm.getq();  
arm.setq(zeros(1,6));  
arm.setpose(T); % set pose of base
```

Methods

getq	return joint coordinates
setq	set joint coordinates
animate	animate a joint coordinate trajectory

Superclass methods (VREP_obj)

getpos	return position of object given handle
setpos	set position of object given handle
getorient	return orientation of object given handle
setorient	set orientation of object given handle
getpose	return pose of object given handle
setpose	set pose of object given handle

can be used to set/get the pose of the robot base.

Superclass methods (VREP_base)

<code>setobjparam_bool</code>	set object boolean parameter
<code>setobjparam_int</code>	set object integer parameter
<code>setobjparam_float</code>	set object float parameter

Properties

`n` Number of joints

See also

[vrep_mirror](#), [vrep_obj](#), [vrep_arm](#), [vrep_camera](#), [vrep_hokuyo](#)

VREP_arm.VREP_arm

Create a robot arm mirror object

R = **VREP_arm**(**name**, **options**) is a mirror object that corresponds to the robot arm named **name** in the V-REP environment.

Options

`'fmt', F` Specify format for joint object names (default `'%s_joint%d'`)

Notes

- The number of joints is found by searching for objects with names systematically derived from the root object name, by default named NAME_N where N is the joint number starting at 0.

See also

[VREP.arm](#)

VREP_arm.animate

Animate V-REP robot

R.**animate**(**qt**, **options**) **animate** the corresponding V-REP robot with configurations taken consecutive rows of **qt** ($M \times N$) which represents an M-point trajectory.

Options

'delay', D	Delay (s) between frames for animation (default 0.1)
'fps', fps	Number of frames per second for display, inverse of 'delay' option
'[no]loop'	Loop over the trajectory forever

See also

[SerialLink.plot](#)

VREP_arm.getq

Get joint angles of V-REP robot

R.**getq**() is the vector of joint angles ($1 \times N$) from the corresponding robot arm in the V-REP simulation.

VREP_arm.setq

Set joint angles of V-REP robot

R.**setq**(**q**) sets the joint angles of the corresponding robot arm in the V-REP simulation to **q** ($1 \times N$).

VREP_arm.teach

Graphical teach pendant

R.**teach**(**options**) drive a V-REP robot by means of a graphical slider panel.

Options

'degrees'	Display angles in degrees (default radians)
'q0', q	Set initial joint coordinates

Notes

- The slider limits are all assumed to be $[-\pi, +\pi]$

See also

[SerialLink.plot](#)

VREP_camera

V-REP mirror of vision sensor object

Mirror objects are MATLAB objects that reflect objects in the V-REP environment. Methods allow the V-REP state to be examined or changed.

This is a concrete class, derived from VREP_mirror, for all V-REP vision sensor objects and allows access to images and image parameters.

Methods throw exception if an error occurs.

Example

```
vrep = VREP();  
camera = vrep.camera('Vision_sensor');  
im = camera.grab();  
camera.setpose(T);  
R = camera.getorient();
```

Methods

grab	return an image from simulated camera
setangle	set field of view
setresolution	set image resolution
setclipping	set clipping boundaries

Superclass methods (VREP_obj)

getpos	return position of object given handle
setpos	set position of object given handle
getorient	return orientation of object given handle
setorient	set orientation of object given handle
getpose	return pose of object given handle
setpose	set pose of object given handle

can be used to set/get the pose of the robot base.

Superclass methods (VREP_base)

setobjparam_bool	set object boolean parameter
setobjparam_int	set object integer parameter
setobjparam_float	set object float parameter

Properties

n Number of joints

See also

[vrep_mirror](#), [vrep_obj](#), [vrep_arm](#), [vrep_camera](#), [vrep_hokuyo](#)

VREP_camera.VREP_camera

Create a camera mirror object

C = **VREP_camera**(**name**, **options**) is a mirror object that corresponds to the a vision sensor named **name** in the V-REP environment.

Options

'fov', A	Specify field of view in degrees (default 60)
'resolution', N	Specify resolution. If scalar $N \times N$ else $N(1) \times N(2)$
'clipping', Z	Specify near Z(1) and far Z(2) clipping boundaries

Notes

- Default parameters are set in the V-REP environment

See also

[vrep_obj](#)

VREP_camera.getangle

Get field of view for V-REP vision sensor

$\text{fov} = \text{C.getangle}(\text{fov})$ is the field-of-view angle to **fov** in radians.

VREP_camera.getclipping

Get clipping boundaries for V-REP vision sensor

$\text{C.getclipping}()$ is the near and far clipping boundaries (1×2) in the Z-direction as a 2-vector [NEAR,FAR].

VREP_camera.getresolution

Get resolution for V-REP vision sensor

$\mathbf{R} = \text{C.getresolution}()$ is the image resolution (1×2) of the vision sensor $\mathbf{R}(1) \times \mathbf{R}(2)$.

VREP_camera.grab

Get image from V-REP vision sensor

$\text{im} = \text{C.grab}(\text{options})$ is an image ($W \times H$) returned from the V-REP vision sensor.

$\text{C.grab}(\text{options})$ as above but the image is displayed using idisp.

Options

‘grey’ Return a greyscale image (default color).

Notes

- V-REP simulator must be running
- Very slow, ie. seconds to **grab** a 256×256 image
- Color images can be quite dark, ensure good light sources
- Uses the signal ‘handle_rgb_sensor’ to trigger a single image generation.

See also

[idisp](#)

VREP_camera.setangle

Set field of view for V-REP vision sensor

C.**setangle**(fov) set the field-of-view angle to **fov** in radians.

VREP_camera.setclipping

Set clipping boundaries for V-REP vision sensor

C.**setclipping**(near, far) set clipping boundaries to the range of Z from **near** to **far**. Objects outside this range will not be rendered.

VREP_camera.setresolution

Set resolution for V-REP vision sensor

C.**setresolution**(**R**) set image resolution to $\mathbf{R} \times \mathbf{R}$ if **R** is a scalar or $\mathbf{R}(1) \times \mathbf{R}(2)$ if it is a 2-vector.

VREP_mirror

V-REP mirror object class

Mirror objects are MATLAB objects that reflect objects in the V-REP environment. Methods allow the V-REP state to be examined or changed.

This abstract class is the root class for all V-REP mirror objects.

Methods throw exception if an error occurs.

Methods

setobjparam_bool	set object boolean parameter
setobjparam_int	set object integer parameter
setobjparam_float	set object float parameter

See also

[vrep_obj](#), [vrep_arm](#), [vrep_camera](#), [vrep_hokuyo](#)

VREP_mirror.VREP_mirror

VREP_mirror object constructor

`v = VREP_mirror(name)` creates a V-REP mirror object.

VREP_mirror.getobjparam_bool

Get boolean parameter of V-REP object

`V.getparam_bool(name, val)` is the boolean parameter with name **name** of the corresponding V-REP object.

VREP_mirror.getobjparam_float

Get float parameter of V-REP object

`V.getparam_float(name, val)` is the float parameter with name **name** of the corresponding V-REP object.

VREP_mirror.getobjparam_int

Get integer parameter of V-REP object

V.getparam_int(name, val) is the integer parameter with name **name** of the corresponding V-REP object.

VREP_mirror.setobjparam_bool

Set boolean parameter of V-REP object

V.setparam_bool(name, val) sets the boolean parameter with name **name** to value **val** within the V-REP simulation engine.

VREP_mirror.setobjparam_float

Set float parameter of V-REP object

V.setparam_float(name, val) sets the float parameter with name **name** to value **val** within the V-REP simulation engine.

VREP_mirror.setobjparam_int

Set integer parameter of V-REP object

V.setparam_int(name, val) sets the integer parameter with name **name** to value **val** within the V-REP simulation engine.

VREP_obj

V-REP mirror of simple object

Mirror objects are MATLAB objects that reflect objects in the V-REP environment. Methods allow the V-REP state to be examined or changed.

This is a concrete class, derived from `VREP_mirror`, for all V-REP objects and allows access to pose and object parameters.

Example

```
vrep = VREP();  
bill = vrep.object('Bill'); % get the human figure Bill  
bill.setpos([1,2,0]);  
bill.setorient([0 pi/2 0]);
```

Methods throw exception if an error occurs.

Methods

<code>getpos</code>	return position of object given handle
<code>setpos</code>	set position of object given handle
<code>getorient</code>	return orientation of object given handle
<code>setorient</code>	set orientation of object given handle
<code>getpose</code>	return pose of object given handle
<code>setpose</code>	set pose of object given handle

Superclass methods (`VREP_base`)

<code>setobjparam_bool</code>	set object boolean parameter
<code>setobjparam_int</code>	set object integer parameter
<code>setobjparam_float</code>	set object float parameter
<code>display</code>	print the link parameters in human readable form
<code>char</code>	convert to string

Properties (read/write)

See also

[vrep_mirror](#), [vrep_obj](#), [vrep_arm](#), [vrep_camera](#), [vrep_hokuyo](#)

VREP_obj.VREP_obj

VREP_obj mirror object constructor

`v = VREP_base(name)` creates a V-REP mirror object for a simple V-REP object type.

VREP_obj.getorient

Get orientation of V-REP object

V.getorient() is the orientation of the corresponding V-REP object as a rotation matrix (3×3).

V.getorient('euler', OPTIONS) as above but returns ZYZ Euler angles.

V.getorient(base) is the orientation of the corresponding V-REP object relative to the **VREP_obj** object **base**.

V.getorient(base, 'euler', OPTIONS) as above but returns ZYZ Euler angles.

Options

See `tr2eul`.

VREP_obj.getpos

Get position of V-REP object

V.getpos() is the position (1×3) of the corresponding V-REP object.

V.getpos(base) as above but position is relative to the **VREP_obj** object **base**.

VREP_obj.getpose

Get pose of V-REP object

V.getpose() is the pose (4×4) of the the corresponding V-REP object.

V.getpose(base) as above but pose is relative to the pose the **VREP_obj** object **base**.

VREP_obj.setorient

Set orientation of V-REP object

V.setorient(R) sets the orientation of the corresponding V-REP to rotation matrix **R** (3×3).

V.setorient(T) sets the orientation of the corresponding V-REP object to rotational component of homogeneous transformation matrix **T** (4×4).

V.setorient(**E**) sets the orientation of the corresponding V-REP object to ZYZ Euler angles (1×3).

V.setorient(**x**, **base**) as above but orientation is set relative to the orientation of **VREP_obj** object **base**.

VREP_obj.setpos

Set position of V-REP object

V.setpos(**T**) sets the position of the corresponding V-REP object to **T** (1×3).

V.setpos(**T**, **base**) as above but position is set relative to the position of the **VREP_obj** object **base**.

VREP_obj.setpose

Set pose of V-REP object

V.setpose(**T**) sets the pose of the corresponding V-REP object to **T** (4×4).

V.setpose(**T**, **base**) as above but pose is set relative to the pose of the **VREP_obj** object **base**.
