# Writing a CSV File

From Mech

Several of the V-REP simulation scenes require a plain-text comma-separated values (CSV) file as input. A CSV file may represent the trajectory of a robot, where each row contains the configuration of the robot at an instant in time, with a fixed time between each row. If the robot has *n* joints, then each row has *n* numbers separated by commas. For example, five rows of a CSV file for a six-joint robot might look like this:



```
2.950000, -1.570000, 0.000000, 0.000000, 0.000000, 0.000000
2.987484, -1.540050, 0.019967, 0.019992, 0.012495, 0.009996
3.024875, -1.510399, 0.039734, 0.039933, 0.024958, 0.019967
3.062079, -1.481344, 0.059104, 0.059775, 0.037360, 0.029888
3.099002, -1.453174, 0.077884, 0.079468, 0.049667, 0.039734
```
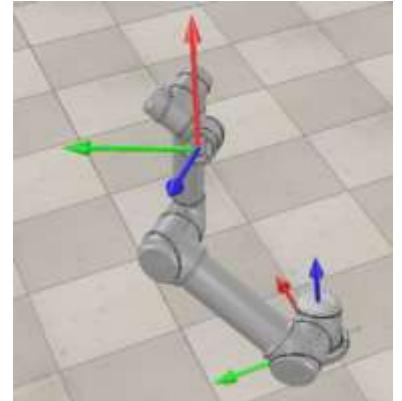
where each number is a joint angle in radians.

Below are code snippets in Python, MATLAB, and Mathematica that you can modify to create your own CSV files.

**This page** contains information on getting started quickly with V-REP. **This page** contains a number of scenes that accept CSV file inputs for visualization of robot trajectories.

## Python

```python
import numpy as np

# Generate random 3x4 matrix of floats y, 3x1 vector of ints d
y = np.random.rand(3, 4)
d = np.random.randint(-100, 100, 3)

# Open a file for output
# Overwrite
f = open("output.csv", "w")
# Append
#f = open("output.csv", "a")

# For loop running 3 times to print each csv row
for i in range(len(d)):
    output = " %10.6f, %10.6f, %10.6f, %10.6f, %d\n" % (y[i,0], y[i,1], y[i,2], y[i,3], d[i])
    f.write(output)

# close file
f.close()
```

The code below is a somewhat simpler version.

```python
import numpy as np

# Generate random 3x4 matrix of floats y, 3x1 vector of ints d
y = np.random.rand(3, 4)
d = np.random.randint(-100, 100, 3)

# Set number precision
y = np.round(y, 6)
```

```
# Overwrite csv file
np.savetxt("output.csv", np.asarray(np.c_[y, d]), delimiter = ",")
```

## MATLAB

```
% Generate random 3x4 matrix of floats y, 3x1 vector of ints d
y = rand(3, 4);
d = randi([-100, 100], 3, 1);

% Open a file for output
% Overwrite
f = fopen('output.csv', 'w');
% Append
%f = fopen('output.csv', 'a');

% For loop running 3 times to print each csv row
for i = 1: length(d)
    fprintf(f, ' %10.6f, %10.6f, %10.6f, %10.6f, %d\n', y(i, :), d(i));
end

% Close file
fclose(f);
```

The code below is a somewhat simpler version.

```
% Generate random 3x4 matrix of floats y, 3x1 vector of ints d
y = rand(3, 4);
d = randi([-100, 100], 3, 1);

% Set number precision
y = round(y, 6);

% Overwrite csv file
csvwrite('output.csv', [y, d]);
```

## Mathematica

```
(* Generate random 3x4 matrix of floats y,3x1 vector of ints d *)

y = RandomReal[1, {3, 4}];
d = RandomInteger[{-100, 100}, {3, 1}];

(* Open a file for output *)
(* Overwrite *)

f = OpenWrite[FileNameJoin[{NotebookDirectory[], "output.csv"}]];
(* Append *)
(* \
f=OpenAppend[FileNameJoin[{NotebookDirectory[],"output.csv"}]]; *)

(* For loop running 3 times to print each csv row *)

Do[WriteString[f,
    ExportString[{Flatten[{SetAccuracy[y[[i, ;;]], 6], d[[i]]}]},
    "CSV"]], {i, Length[d]}];

(* Close file *)
Close[f];
```

The code below is a somewhat simpler version.

```
(* Generate random 3x4 matrix of floats y,3x1 vector of ints d *)

y = RandomReal[1, {3, 4}];
d = RandomInteger[{-100, 100}, {3, 1}];

(* Set number precision *)
y = SetAccuracy[y, 6];

(* Overwrite csv file *)

Export[FileNameJoin[{NotebookDirectory[], "output.csv"}],
  ArrayFlatten[{{y, d}}], "CSV"];
```

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