Midterm Project File Submission

You will be emailing me *two* data files for the Midterm Project (containing the joint variables), and the purpose of this document is to state clearly the format of those files. Please adhere to this format.

Naming Convention. You will submit two files, one for the NORTH robot and one for the SOUTH robot. The names of these files will consist of your *THREE UPPER-CASE* initials followed by either `N.txt` or `S.txt` for the NORTH or SOUTH robots. For example, the files I created had filenames of `GPSN.txt` and `GPSS.txt` respectively.

File content. Each file will contain *four* columns of data, organized as

$$\begin{bmatrix}\text{time (sec)} & d_1 \text{ (meters)} & \theta_2 \text{ (RAD)} & \theta_3 \text{ (RAD)}\end{bmatrix}$$

The files will contain *only* numerical data; the labels above are just to denote what the columns represent. For example, the file will look like

```
0.0000  0.345  1.332  -3.678
0.0160  0.346  1.347  -3.634
            ...
12.544  0.347  1.212  -3.684
12.560  0.345  1.332  -3.679
```

The numbers in this file (except for time in the first column) are *completely* contrived, although the joint variables *should* return to almost exactly their starting values. The duration ($4\pi = 12.5664$ seconds) and stepsize (0.016 sec) of this motion result in 785 samples (786 if we count time $t = 0$); the column vector of sample times can be easily created in MATLAB during your trajectory determination, or from the command window by the commands

```
>> dt = 0.016;        % Sampling time of Staubli robots
>> t = [0:785]'*dt;   % 786 x 1 column vector of times from t = 0.00 to t = 12.56 seconds
```

Composing the final array. After you have used your `solve()` function to find the joint variables at each of the object positions, you may have those variables in 786×1 column vectors names `d1`, `theta2`, and `theta3` (or you might keep them in a single 786×3 array called, say, `joint`). You may also have 786×1 time vector in column vector `t`.

You now need to compose the 786×4 array with time as the first column, and the three corresponding joint variables as the remaining three columns (as above). If you have distinct joint variables you might do

```
jt_vars = [t d1 theta2 theta3];    % Compose 786x4 matrix to give to Starr
```

and if you had all three joint variables in a 786×3 array you might do

```
jt_vars = [t joint];    % Compose 786x4 matrix to give to Starr
```

Saving as a textfile. This is easy. Using array `jt_vars` above, simply do

```
save GPSN.txt jt_vars -ascii
```

and textfile `GPSN.txt` will be created in your current directory. The "`-ascii`" option must be present in the `save` command to create a textfile; otherwise a binary file will be created.