# Install

1. Unzip the zip file
2. Go to the unziped directory
3. Run the fallowing command:

    make

# Run

Execute the fallowing command:

    ./Synthesizer <input-file-name> <output-directory-name>

For example, use can run the fallowing command:

    ./Synthesizer input/DCDC-2O/DCDC-2O-a.in output/DCDC-2O/DCDC-2O-a

# Uninstall

Execute the fallowing command

    make clean

# Input File

The input file uses matrices to parse data. Vectors are in the fallowing format:

[v1 v2 v3... vn]

And a matrix is described as below:

[a11 a12 ... a1n ; a21 a22 ... a2n ; ... ; an1 an2 ... ann]

The overall input format for this tool is organized as follows.

1. In the first line, the number of dimensions must be defined in this format:

D = <number of continous state dimensions>

2. Next keyword "Modes :" comes before the list of different modes. For each mode there is a name and the dynamics associated with that mode. Each mode is described as fallow:

<name> = <A>

<name> = <B>

Where A and B are matrix and vector in the fallowing equation:

X' = A X + B

3. After defining all the modes, by using keyword "Safe_Region :" safe region S can be defined as fallow:

<A> <B>

Where S = {X | AX < B}

4. Then after keyword "Disturbance :" set D = {X | AX < B} is defined:

<A> <B>

5. Finaly the list of modes that will be used for partitioning will come in a vector after keyword "Partition_Modes :"

# Output Files

After executing the program, file "IsInDisturbanceInvariant.m" will be created in the output directory which is a code in MATLAB contains a function X → boolean. Given a continous state, this function decides if the state is in the disturbance invariant.

If the number of dimensions is 2, then "draw.m" will be created in the output directory which is a code in MATLAB that draws the founded disturbance invariant.

File "DCDC2.m" in the "MATLAB Simulation" directory, shows us how we can use these files to simulate the whole system.