Matlab interface in Madagascar

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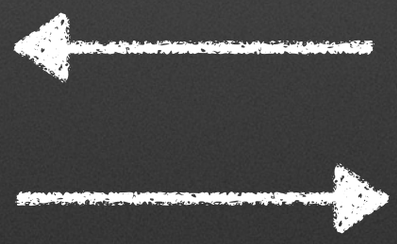
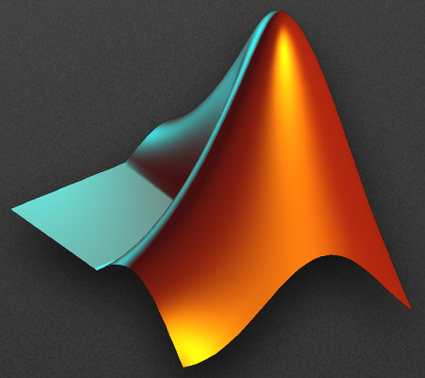
Qingdao, China

Outline

- Instructions of configuration
- How to read and write RSF files in Matlab?
- How to call Matlab function in Madagascar?





Instructions of configuration

> When install Madagascar run

./configure API=matlab

or specify the path as

./configure API=matlab MATLAB=/path/to/matlab MEX=/path/to/mex

> Install Madagascar as usual

> Set Matlab path to

$RSFROOT/lib

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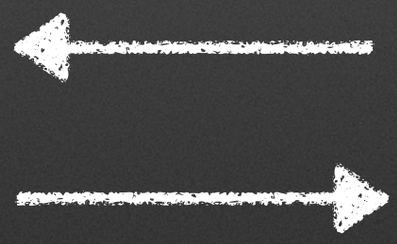
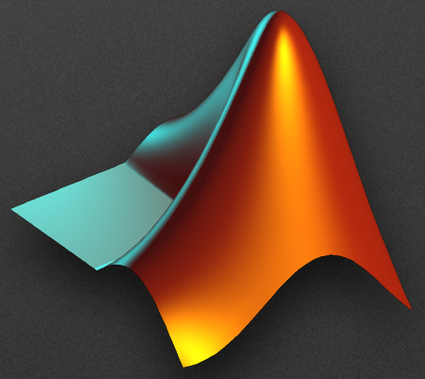




Matlab interface

- rsf_read/rsf_read_all( ) // read data from a RSF file
- rsf_write/rsf_write_all( ) // write data to a RSF file
- rsf_par( ) // get parameter from a RSF files
- rsf_dim( ) // extract dimensions from a RSF files
- rsf_create( ) // write a RSF header
- m8r( ) // run a RSF program on Matlab data

Read/write RSF files in Matlab

```
% Add m8r api to matlab search path
path(path, '/Users/fangg/Research/RSF/RSFROOT/lib');

dims = rsf_dim('lena.rsf');
```

size = rsf_dim(‘input.rsf’)

input — input RSF-file name

size — size of data

Read/write RSF files in Matlab

```
lena = zeros(dims');
rsf_read(lena, 'lena.rsf');
```

- rsf_read(data, ‘infile.rsf’ [, ‘same’])

  infile — input RSF-file name

  data — output data array

  same — optional

Read/write RSF files in Matlab

```
data = zeros(dims');
rsf_read(data, 'mona.rsf');
```

- [data size delta origin label unit] = rsf_read_all('infile.rsf')

Read/write RSF files in Matlab

```
% Call RSF program
nlena  = m8r('sfnoise seed=2015 var=1400', lena);
```

- output = m8r(‘common’, input)

  input — input Matlab arrary

  output — output Matlab array

  common — RSF program

Read/write RSF files in Matlab

```
% Creat RSF head from a exsit RSF file
rsf_create('nlena.rsf','lena.rsf');

% write data to RSF file
rsf_write(nlena, 'nlena.rsf');
```

- rsf_create(‘new_file.rsf’, ‘old_file.rsf’ | dims)

  ‘new_file.rsf’ — new file name

  ‘old_file.rsf’ — old file name

  dims — n#, dimensions

Read/write RSF files in Matlab

```
% Creat RSF head from a exsit RSF file
rsf_create('nlena.rsf','lena.rsf');

% write data to RSF file
rsf_write(nlena, 'nlena.rsf');
```

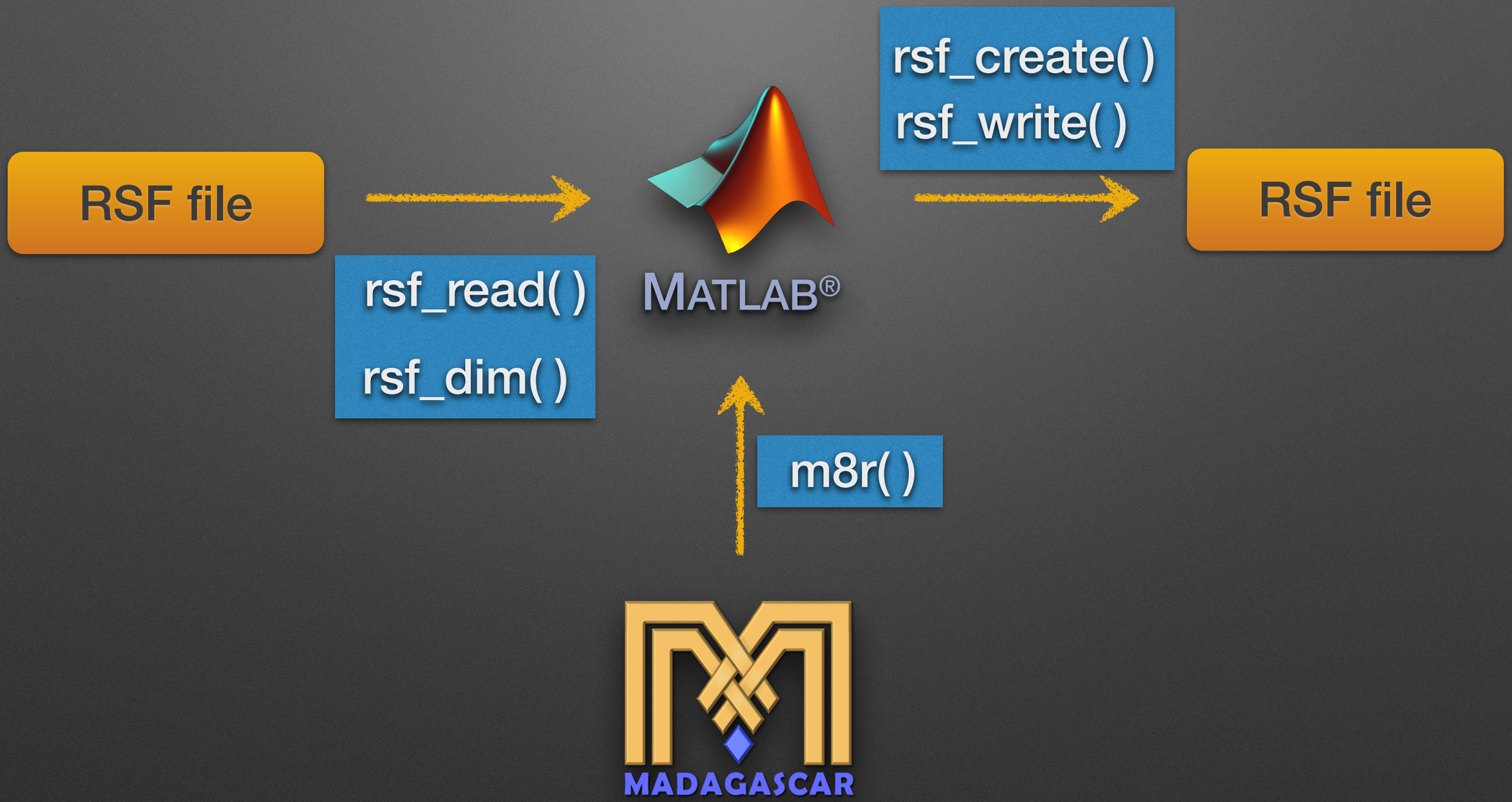
- rsf_write(data, ‘outfile.rsf’[,’same’])

  infile — input RSF-file name

  data — output data array

  same — optional

Read/write RSF files in Matlab



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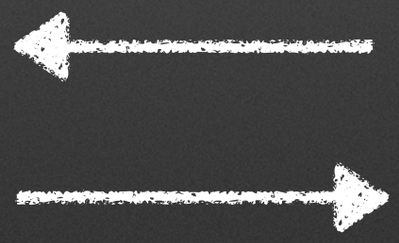
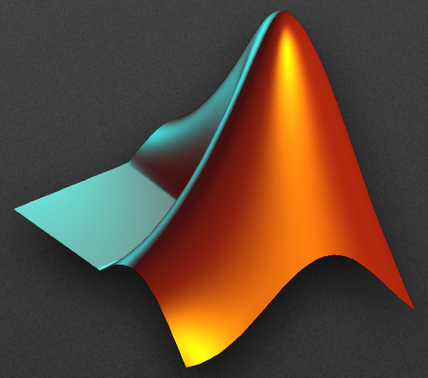
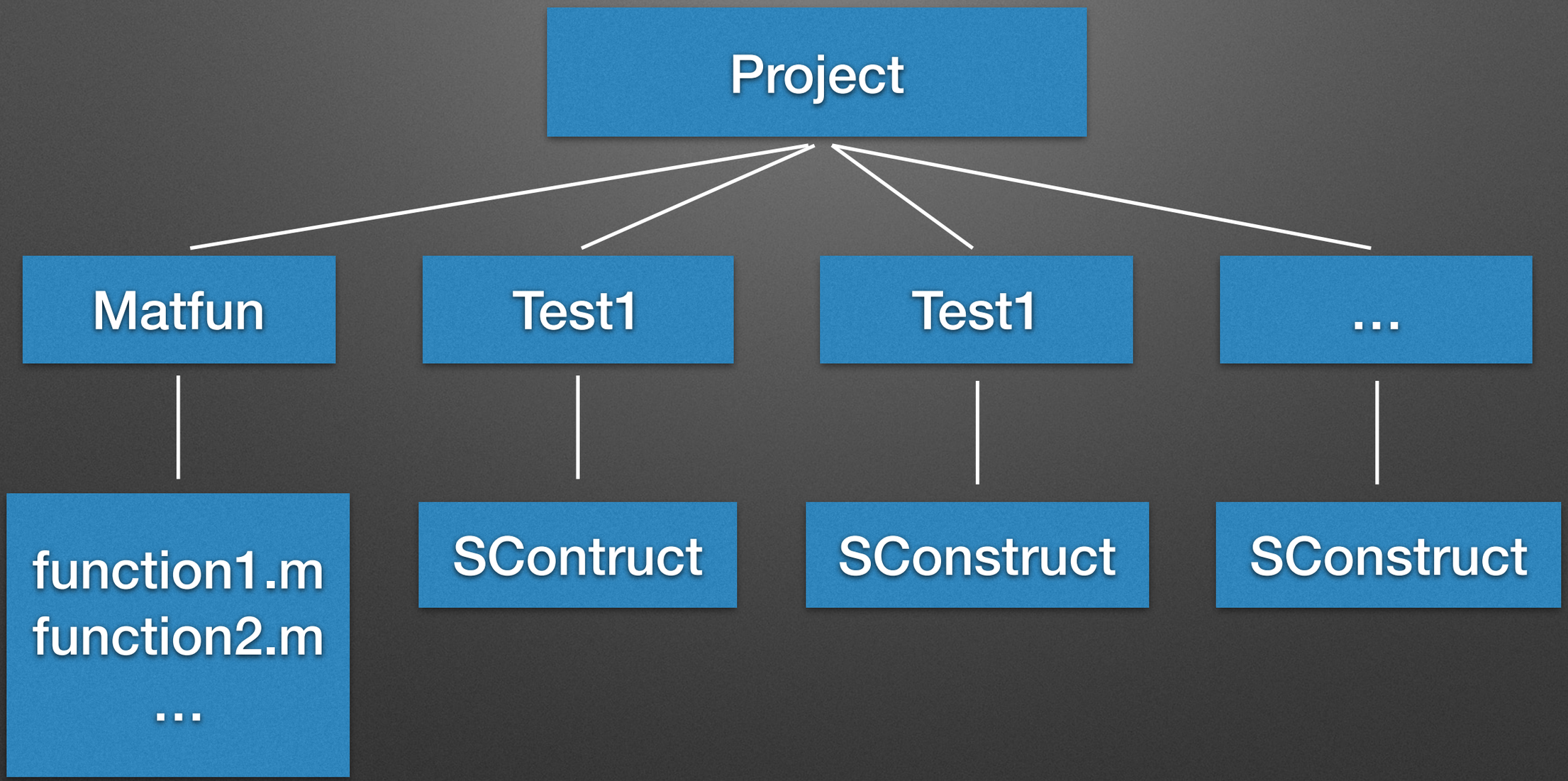




Call Matlab function in Madagascar



Call Matlab function in Madagascar

```
function clip(in,out,clip)
%CLIP Clip the data

dims = rsf_dim(in);
n1 = dims(1);                   % trace length
n2 = prod(dims(2:end)); % number of traces
trace = 1:n1;                   % allocate trace
rsf_create(out,in)          % create an output file

for i2 = 1:n2                   % loop over traces
    rsf_read(trace,in,'same');
    trace(trace >    clip) =  clip;
    trace(trace < - clip) = -clip;
    rsf_write(trace,out,'same');
end
```

Call Matlab function in Madagascar

```
19 ##########################################
20 # INITIALIZATION FOR MATLAB
21 ##########################################
22 matlab          = WhereIs('matlab')
23 matROOT = '../Matfun'
24 matfun = 'clip'
25 matlabpath = os.environ.get('MATLABPATH',os.path.join(RSFROOT,'lib'))
26
27 if not matlab:
28     sys.stderr.write('\nCannot find Matlab.\n')
29     sys.exit(1)
```

Call Matlab function in Madagascar

```
Flow('clip',[os.path.join(matROOT,matfun+'.m'),'spike'],
     '''MATLABPATH=%(matlabpath)s %(matlab)s -nosplash -nojvm -r
     "addpath %(matROOT)s;
     %(matfun)s('${SOURCES[1]}','${TARGET}',0.5);
     quit"
     '''%vars(),stdin=0,stdout=-1)
```

Call Matlab function in Madagascar

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```

Output

Call Matlab function in Madagascar

```
Flow('clip',[os.path.join(matROOT,matfun+'.m'),'spike'],
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     "addpath %(matROOT)s;
     %(matfun)s('${SOURCES[1]}','${TARGET}',0.5);
     quit"
     '''%vars(),stdin=0,stdout=-1)
```

M-function

Call Matlab function in Madagascar

```
Flow('clip',[os.path.join(matROOT,matfun+'.m'),'spike'],
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     "addpath %(matROOT)s;
     %(matfun)s('${SOURCES[1]}','${TARGET}',0.5);
     quit"
     '''%vars(),stdin=0,stdout=-1)
```

Input parameters

Call Matlab function in Madagascar

```
Flow('clip',[os.path.join(matROOT,matfun+'.m'),'spike'],
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     "addpath %(matROOT)s;
     %(matfun)s('${SOURCES[1]}','${TARGET}',0.5);
     quit"
     '''%vars(),stdin=0,stdout=-1)
```

```
MATLABPATH=$RSFROOT/lib /Applications/
MATLAB_R2014b.app/bin/matlab -nosplash -nojvm -r
"addpath ../Matfun; clip('spike.rsf','clip.rsf',0.5); quit"
```

Matlab interface

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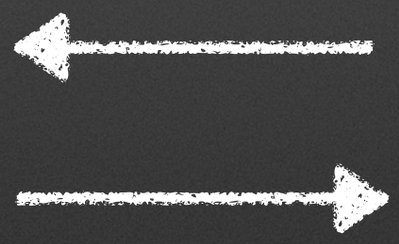
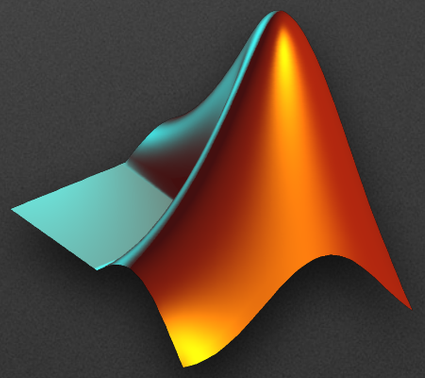
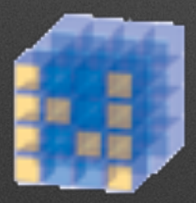




Alternative way to use Matlab in Madagascar

Using open-source free software, such as

- GNU: Octave
- Python: Numpy, SciPy, Matplot, etc



A Python interface to Madagascar is installed by default

Thanks!