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MCA recovery process 2024

How to replace mex-based functions
of RICE Wavelet Toolbox 3.0

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MCALAB

REPRODUCIBILITY IN
IMAGE DECOMPOSITION

MCALab: Reproducible Research in Signal and Image Decomposition and Inpainting

Morphological component analysis of signals and images has far-reaching applications in science and technology, but some consider it problematic and even intractable. Reproducible research is essential to give MCA a firm scientific foundation. Researchers developed MCALab to demonstrate key MCA concepts and make them available to interested researchers.

Published in: [Computing in Science & Engineering](#) (Volume: 12, Issue: 1, Jan.-Feb. 2010)

<https://fadili.users.greyc.fr/demos/oads/mcalab/Home.html>

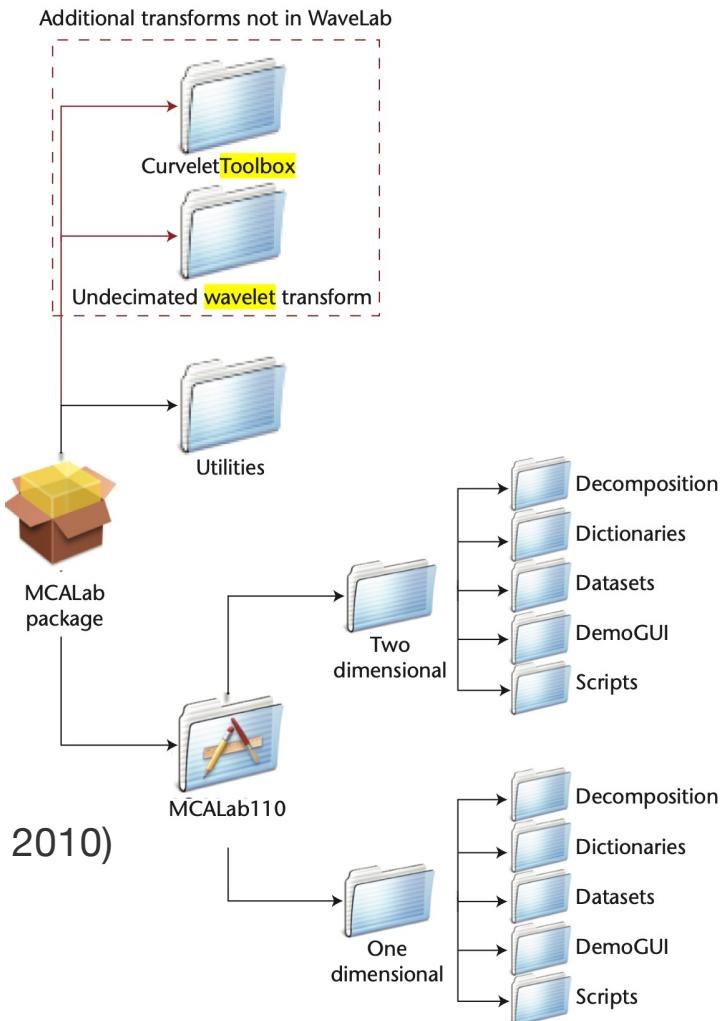


Figure 4. MCALab package architecture. MCALab has two directories—one for 1D signals and another for 2D images. Each of these directories has the same organization.

WaveLab (<http://playfair.stanford.edu/~wavelab>). We therefore recommend that users download and install WaveLab for MCALab to work properly.

MCALab also incorporates software for two other transforms not included in WaveLab: the wrapping version of the fast discrete curvelet transform (FDCT) implemented in CurveLab (www.curvelet.org)¹⁰ and the undecimated discrete wavelet transform (UDWT) implemented in the Rice wavelet toolbox (www.dsp.rice.edu/software/rwt.shtml). We slightly modified the FDCT Matlab functions `fdct_wrapping.m` and `ifdct_wrapping.m` (not the Matlab Mex files) to match our dictionary data structure and implement curvelets at the finest scale. We strongly recommend that users download this modified version or at least use our `fdct_wrapping.m` and `ifdct_wrapping.m`. Both of these transforms are available in the `MCALabWithUtilities` MCALab version (the dashed rectangle in Figure 4) in the `MCALabWithUtilities/CurveletToolbox` and `MCALabWithUtilities/UDWT` subdirectories (for further details, see `Contents.m` in `MCALabWithUtilities`). We also encourage users to read the transforms' software license agreements, which are available on the respective Web sites.

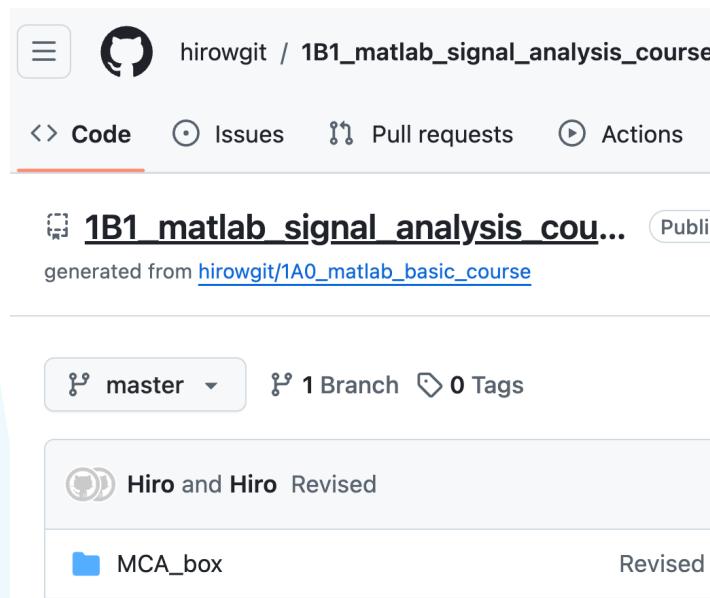
Because MCALab has external library dependencies, reproducibility and sensitivity to third-party libraries are a legitimate concern. However, the dependencies are essentially on the transforms, and given our implementation of the dictionaries, these transforms are called as external functions from MCALab. So, no modification is necessary on the MCALab code if such transforms are corrected or modified. Moreover, to make MCALab's behavior with these transforms more robust, we

Points:

1. We recovered the Rice Wavelet Toolbox for MCA usage.
2. Necessary mex file already complied in Mac and Windows.

Download from here:

https://github.com/hirowgit/1B1_matlab_signal_analysis_course



hirowgit / 1B1_matlab_signal_analysis_course

Code Issues Pull requests Actions

1B1_matlab_signal_analysis_cou... Public

generated from [hirowgit/1A0_matlab_basic_course](#)

master 1 Branch 0 Tags

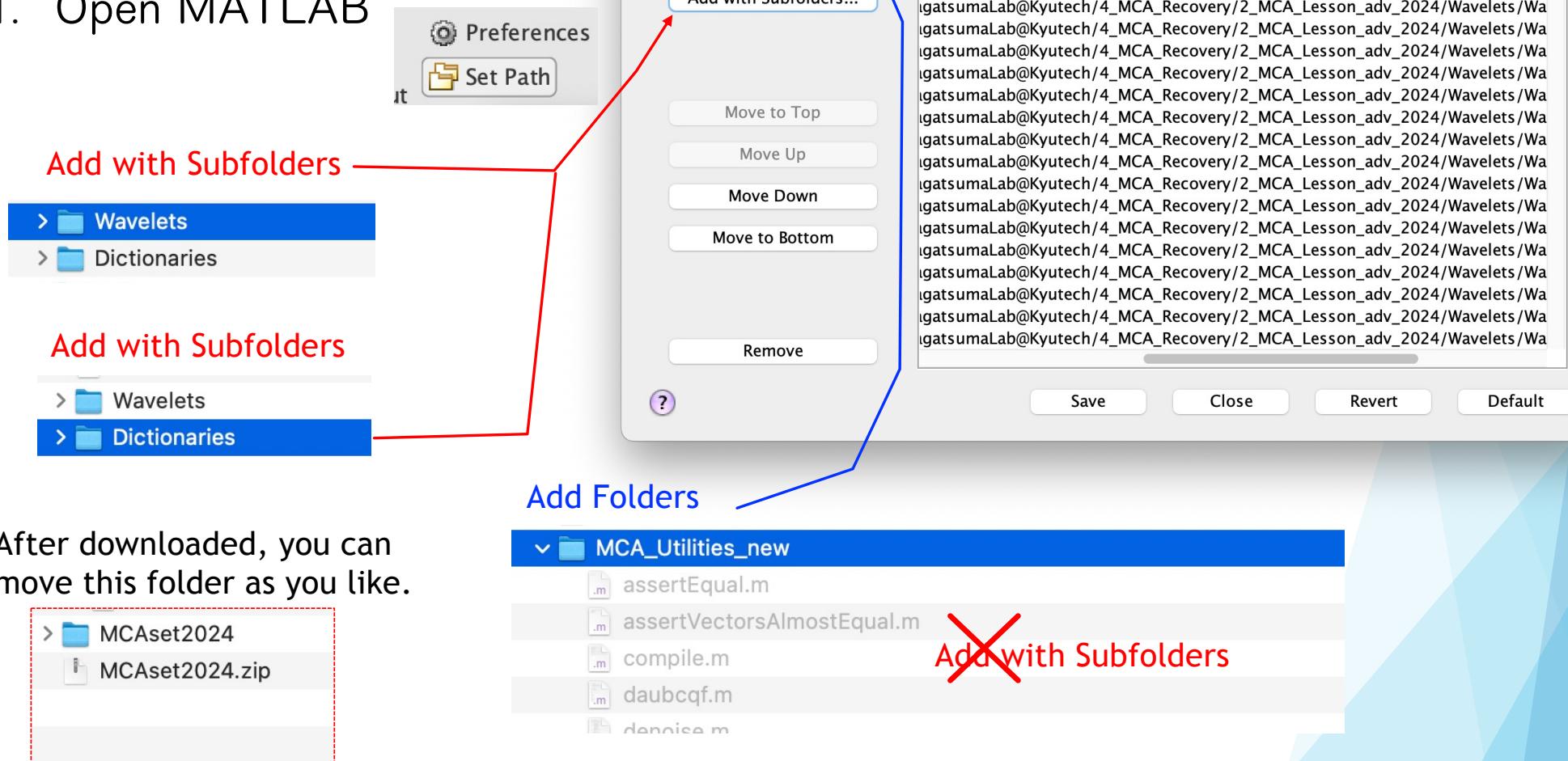
Hiro and Hiro Revised

MCA_box Revised

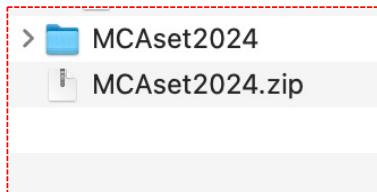
https://github.com/hirowgit/1B1_matlab_signal_analysis_course/tree/master/MCA_box

Set them in path

I. Open MATLAB



After downloaded, you can move this folder as you like.



https://github.com/hirowgit/1B1_matlab_signal_analysis_course

If you already have Wavelab850

- I. You can use your **toolbox/Wavelab850** instead

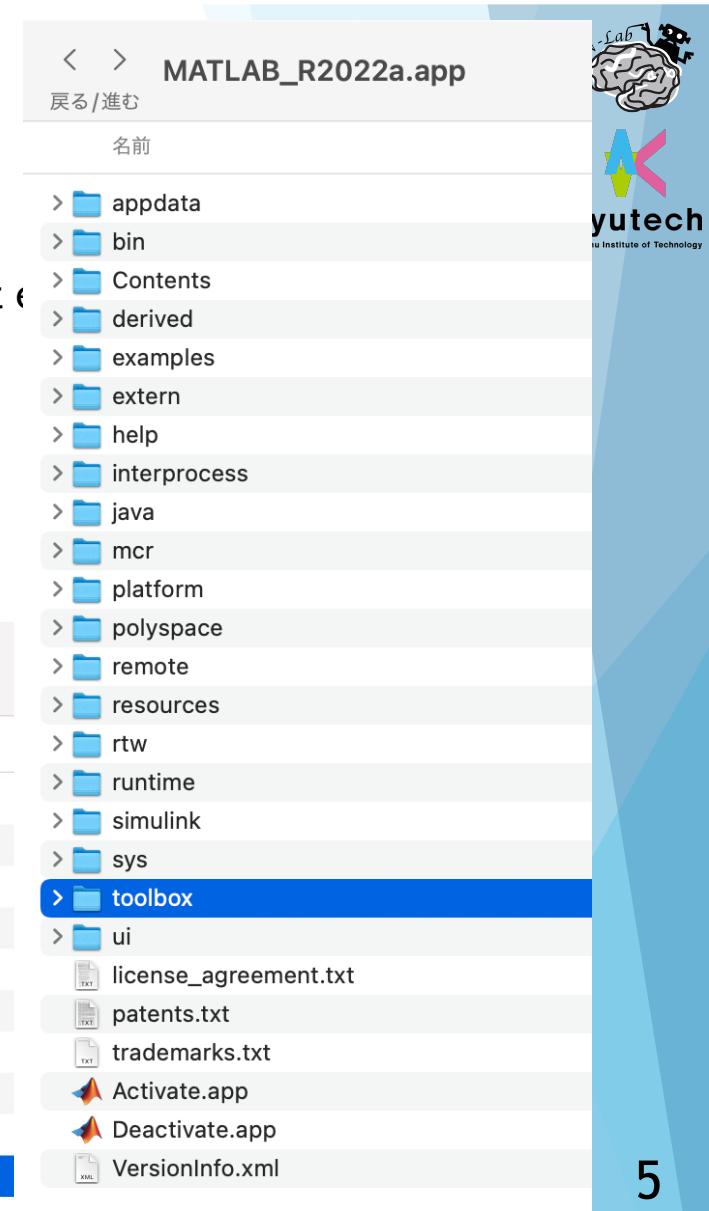
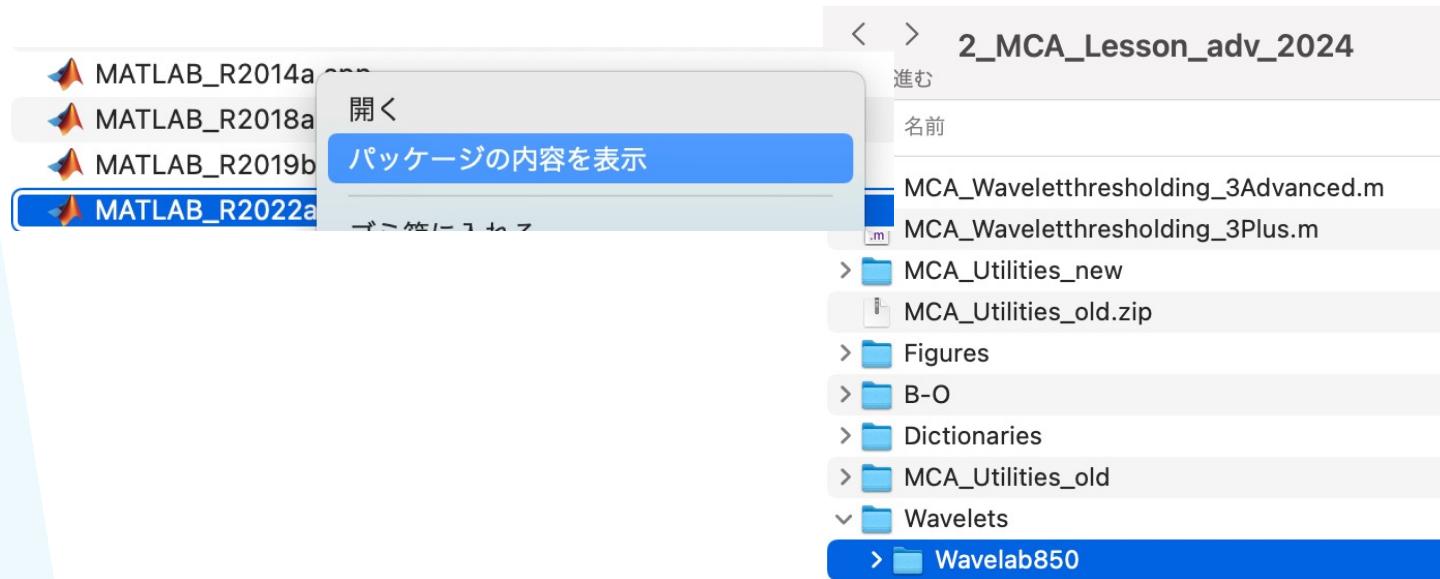
Directory /Applications/MATLAB_R2022a.app/toolbox/Wavelab850/ does not exist.

Enter the correct path (type 0 to exit):

/Applications/MATLAB_R2022a.app/toolbox/Wavelab850/

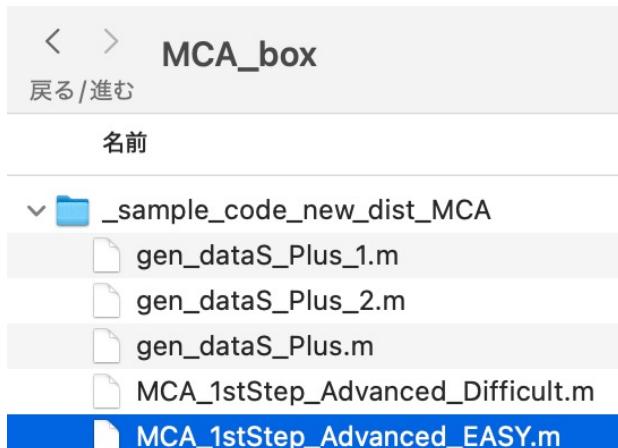
WAVELABPATH =

```
'/Applications/MATLAB_R2022a.app/toolbox/Wavelab850/'
```

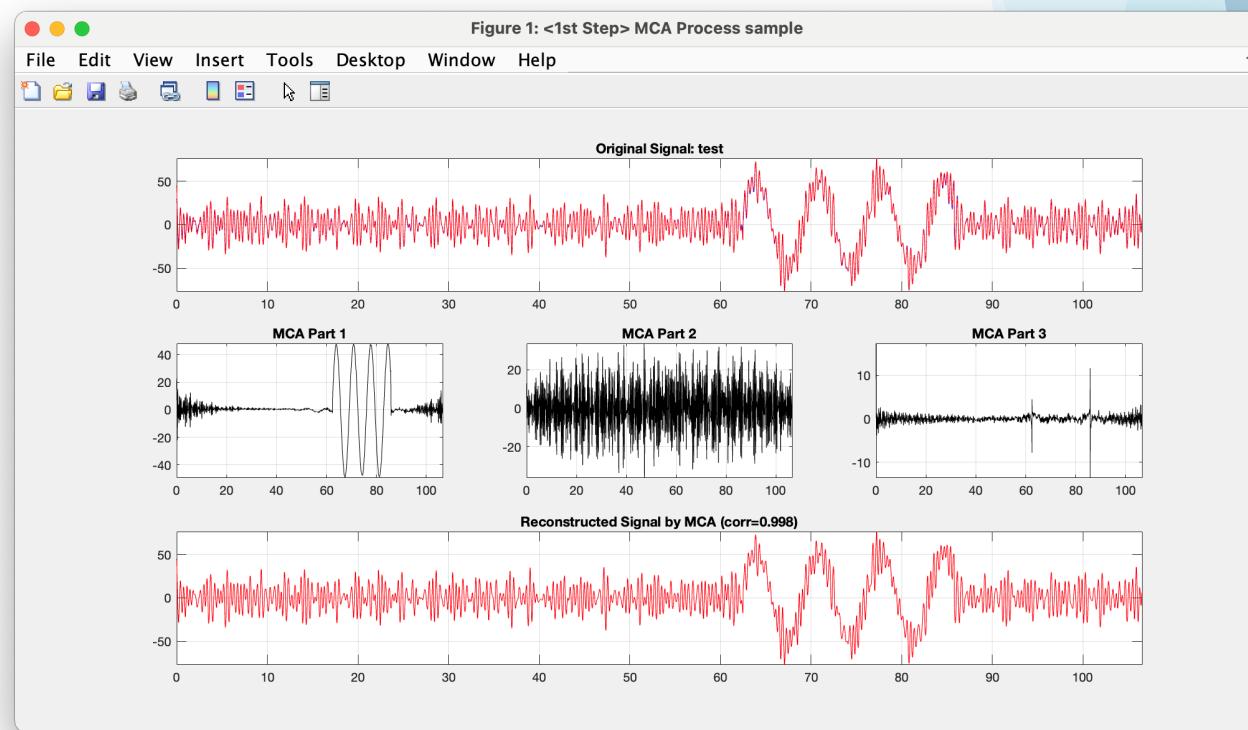


Sample Code (1)

I. Run “MCA_1stStep_Advanced_EASY.m”

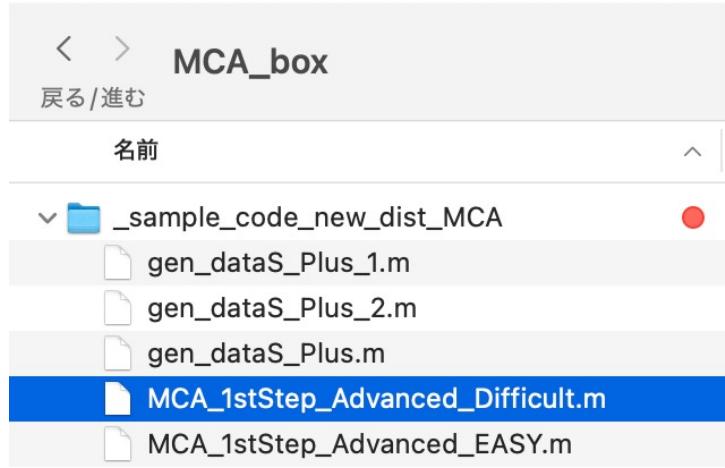


MCA_1stStep_Advanced_EASY.m

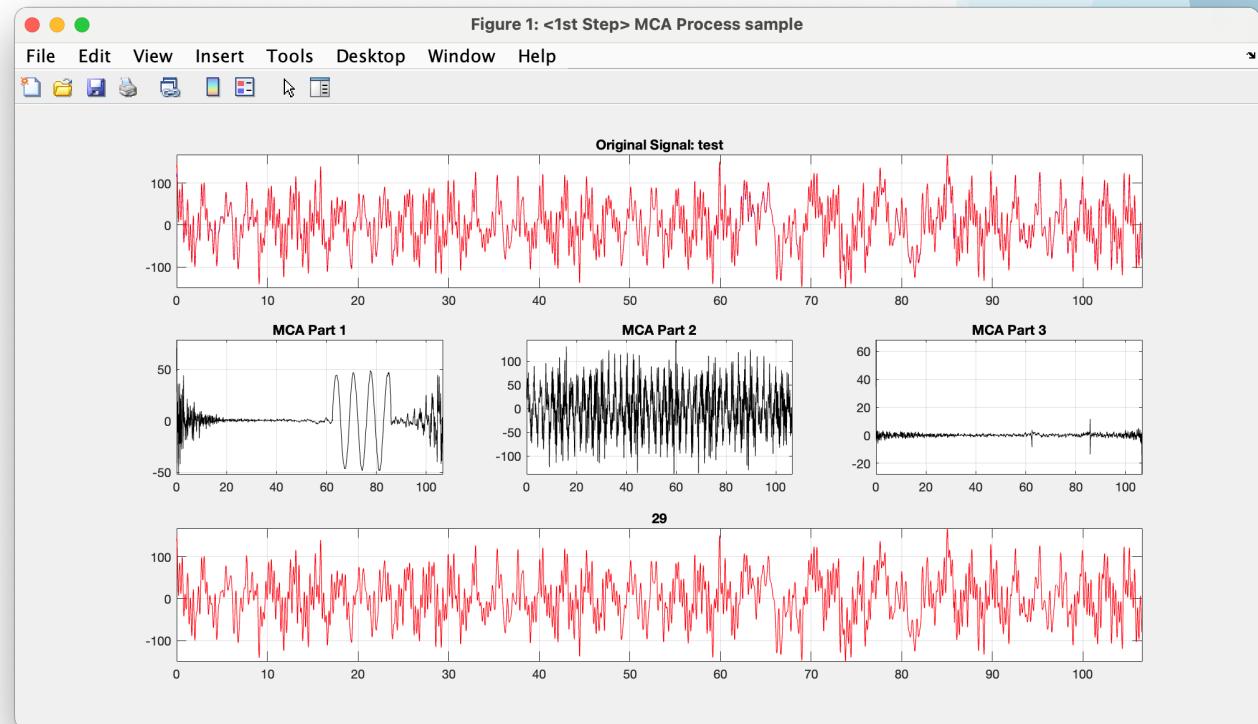


Sample Code (2)

I. Run “MCA_1stStep_Advanced_Difficult.m”



MCA_1stStep_Advanced_Difficult.m





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Please enjoy the toolkit.

If you want to compile by yourself

- i. Tell us if you have a concern.

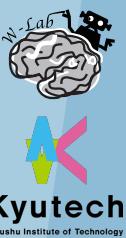
Try to recompile via MATLAB MEX file

```
>> cd /Users/hiro/Desktop/MCA_Utilsities/Python_install_test2/rwt-master/bin/  
>> pwd
```

```
ans =
```

```
'/Users/hiro/Desktop/MCA_Utilsities/Python_install_test2/rwt-master/bin'
```

```
>> compile  
Verbose mode is on.  
... Looking for compiler 'Xcode with Clang' ...  
... Looking for environment variable 'DEVELOPER_DIR' ...No.  
... Executing command 'xcode-select -print-path' ...Yes  
('/Applications/Xcode.app/Contents/Developer').  
... Looking for folder '/Applications/Xcode.app/Contents/Developer' ...Yes.  
... Executing command 'which xcrun' ...Yes ('/usr/bin/xcrun').  
... Looking for folder '/usr/bin' ...Yes.  
... Executing command 'defaults read com.apple.dt.Xcode  
IDECodeVersionForAgreedToGMLicense' ...No.  
... Executing command 'defaults read /Library/Preferences/com.apple.dt.Xcode  
IDECodeVersionForAgreedToGMLicense' ...Yes ('14.0').  
... Executing command '...
```





```
-syslibroot,/Applications/Xcode.app/Contents/Developer/Platforms/MacOSX.platform/Developer/SDKs/MacOSX13.1.sdk -bundle -Wl,-  
exported_symbols_list,"/Applications/MATLAB_R2022a.app/extern/lib/maci64/mexFunction.map"  
/var/folders/mg/w5t8lkhc8xj79f001s7kzpfh0000gp/T/mex_936453342763292_37173/mirdwt.o  
/var/folders/mg/w5t8lkhc8xj79f001s7kzpfh0000gp/T/mex_936453342763292_37173/irdwt.o  
/var/folders/mg/w5t8lkhc8xj79f001s7kzpfh0000gp/T/mex_936453342763292_37173/init.o  
/var/folders/mg/w5t8lkhc8xj79f001s7kzpfh0000gp/T/mex_936453342763292_37173/platform.o  
/var/folders/mg/w5t8lkhc8xj79f001s7kzpfh0000gp/T/mex_936453342763292_37173/c_mexapi_version.o -O -Wl,-  
exported_symbols_list,"/Applications/MATLAB_R2022a.app/extern/lib/maci64/c_exports_mexfileversion.map" -L"/Applications/MATLAB_R2022a.app/bin/maci64" -lmx -lmex -lmat -lc++ -o  
/Users/hiro/Desktop/MCA_Utils/PYTHON_install_test2/rwt-master/bin/../bin/mirdwt.mexmaci64  
MEX completed successfully.
```

Success!

```
>> x = makesig('LinChirp', 8);  
h = daubcqf(4, 'min');  
L = 2; % For 8 values in x we would normally be L=2  
[y, L] = mdwt(x, h, L);  
y_corr = [1.1097 0.8767 0.8204 -0.5201 -0.0339 0.1001 0.2201 -0.1401];  
L_corr = 2;
```



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MEX compiler note:

The screenshot shows a web browser window displaying the MATLAB Help Center. The URL is jp.mathworks.com/help/matlab/matlab_external/compiling-source-mex-file-fails.html. The page title is "MEX ファイルのコンパイルの失敗". The content includes sections for "サンプル ファイルのビルト" (Sample File Build), "サポートされるコンパイラの使用" (Supported Compilers), "Windows でファイルが見つからない" (File Not Found on Windows), "Linux gcc -fPIC エラー" (Linux gcc -fPIC Error), "Fortran MEX ファイルでのコンパイラ エラー" (Fortran MEX File Compiler Error), and "UNIX における C/C++ MEX ファイルのコンパイルでの構文エラー" (Syntax Errors in C/C++ MEX File Compilation). A sidebar on the left lists various MATLAB documentation categories.

https://jp.mathworks.com/help/matlab/matlab_external/compiling-source-mex-file-fails.html

<https://jp.mathworks.com/support/requirements/supported-compilers.html>

For Windows:

Microsoft Visual C++再頒布可能パッケージのダウンロード・インストール

VC++プログラミング言語に基づくアプリを実行するには、それに対応するMicrosoft Visual C++再頒布可能パッケージが必要です。

こちらがMicrosoft Visual C++再頒布可能パッケージの一覧表です。

32-BIT	64-BIT
Microsoft Visual C++ 2005 再頒布可能パッケージ (x86)	Microsoft Visual C++ 2005 再頒布可能パッケージ (x64)
Microsoft Visual C++ 2008 再頒布可能パッケージ (x86)	Microsoft Visual C++ 2008 再頒布可能パッケージ (x64)
Microsoft Visual C++ 2010 再頒布可能パッケージ (x86)	Microsoft Visual C++ 2010 再頒布可能パッケージ (x64)
Microsoft Visual C++ 2012 再頒布可能パッケージ (x86)	Microsoft Visual C++ 2012 再頒布可能パッケージ (x64)
Microsoft Visual C++ 2013 再頒布可能パッケージ (x86)	Microsoft Visual C++ 2013 再頒布可能パッケージ (x64)
Microsoft Visual C++ 2015-2022 再頒布可能パッケージ (x86)	Microsoft Visual C++ 2015-2022 再頒布可能パッケージ (x64)

<https://www.partitionwizard.jp/news/microsoft-visual-c-plus-plus-download.html>