Wavelet Reminder Sheet

- **One Dimensional:** Suppose we have two signals `y1` and `y2` and we want to perform a level 3 Haar decomposition. Here is the syntax:

```
n = 3;
fam = 'db1';
[C1,L1] = wavedec(y1,n,fam);
[C2,L2] = wavedec(y2,n,fam);
```

  - To extract the level one details:

```
y1d1 = wrcoef('d',C1,L1,fam,1);
y2d1 = wrcoef('d',C2,L2,fam,1);
```

  - To extract the level one approximations:

```
y1a1 = wrcoef('a',C1,L1,fam,1);
y2a1 = wrcoef('a',C2,L2,fam,1);
```

  - To extract the level two details:

```
y1d2 = wrcoef('d',C1,L1,fam,2);
y2d2 = wrcoef('d',C2,L2,fam,2);
```

  - To extract the level two approximations:

```
y1a2 = wrcoef('a',C1,L1,fam,2);
y2a2 = wrcoef('a',C2,L2,fam,2);
```

  - You can then see how to get the level 3 details and approximations `y1d3`, `y2d3`, `y1a3`, `y2a3`.

  - To plot any one of these, for instance `y1d2`, just enter `plot(y1d2)`.

- **Two Dimensional:** Suppose we have two images `y1` and `y2` and we want to perform a level 3 Haar decomposition. Here is the syntax:

```
n = 3;
fam = 'db1';
[C1,S1] = wavedec2(y1,n,fam);
[C2,S2] = wavedec2(y2,n,fam);
```

  - To extract the level one details and approximations of `y1` and `y2`, respectively:

    * horizontal details:

```
y1H1 = wrcoef2('h',C1,S1,fam,1);
y2H1 = wrcoef2('h',C2,S2,fam,1);
```

    * vertical details:

```
y1V1 = wrcoef2('v',C1,S1,fam,1);
y2V1 = wrcoef2('v',C2,S2,fam,1);
```

* diagonal details:

```
y1D1 = wrcoef2('d',C1,S1,fam,1);
y2D1 = wrcoef2('d',C2,S2,fam,1);
```

* approximations:

```
y1A1 = wrcoef2('a',C1,S1,fam,1);
y2A1 = wrcoef2('a',C2,S2,fam,1);
```

– To extract the level two details and approximations of `y1` and `y2`, respectively:

* horizontal details:

```
y1H2 = wrcoef2('h',C1,S1,fam,2);
y2H2 = wrcoef2('h',C2,S2,fam,2);
```

* vertical details:

```
y1V2 = wrcoef2('v',C1,S1,fam,2);
y2V2 = wrcoef2('v',C2,S2,fam,2);
```

* diagonal details:

```
y1D2 = wrcoef2('d',C1,S1,fam,2);
y2D2 = wrcoef2('d',C2,S2,fam,2);
```

* approximations:

```
y1A2 = wrcoef2('a',C1,S1,fam,2);
y2A2 = wrcoef2('a',C2,S2,fam,2);
```

– You can now see how to extract the level 3 details and approximations.

– To plot any one of these, first enter just one time:

```
map = [ 1 1 1; 0 0 0 ];
```

Then for any detail or approximation you wish to plot, for instance y2V2, enter

```
image(y2V2);colormap(map);
```

You do not need to enter `map` again.