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| 1  |   |

tic;

#### Riddhish Bhalodia and Alankar Kotwal

```
% the phantom image
img = phantom(256);
```

## PART A: Filtering the backprojection in 3 different ways

The function partA is the supporting one

```
[out11,out12,out21,out22,out31,out32] = partA(img);
% The L parameter is tuned in the function PartA, which contains the
% function myFilter12.
figure('Name','PartA: Ram Lak Filter');
subplot(1,2,1);imagesc( out11 ); title('Manual filtering:Ram Lak, L=wmax')
colormap(gray(256)); axis image; axis off
subplot(1,2,2);imagesc( out12 ); title('Manual filtering:Ram Lak, L=wmax/2')
colormap(gray(256)); axis image; axis off
figure('Name','PartA: Shepp-Logan Filter');
subplot(1,2,1);imagesc( out21 ); title('Manual filtering:Shepp-Logan, L=wmax')
colormap(gray(256)); axis image; axis off
subplot(1,2,2);imagesc( out22 ); title('Manual filtering:Shepp-Logan, L=wmax/2')
colormap(gray(256)); axis image; axis off
figure('Name','PartA: Cosine Filter');
subplot(1,2,1);imagesc( out31 ); title('Manual filtering:Cosine Filter, L=wmax')
colormap(gray(256)); axis image; axis off
subplot(1,2,2);imagesc( out32 ); title('Manual filtering:Cosine Filter, L=wmax/2')
colormap(gray(256)); axis image; axis off
% The diffrences in the images can be seen in the same manner and they are
```

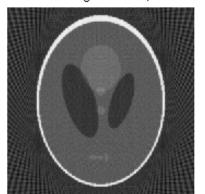
```
% justified, just too many combinations to be put here. so one can just
% execute the following commented code for observing the diffrence

% figure;
% imagesc( out31 - out11 );
% colormap(gray(256)); axis image; axis off
```

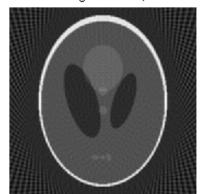
#### Unfiltered Backprojection



Manual filtering:Ram Lak, L=wmax



Manual filtering:Ram Lak, L=wmax/2

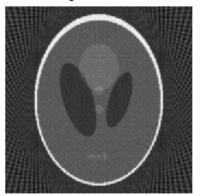


 $Manual\ filtering: Shepp-Logan,\ L=wmaxManual\ filtering: Shepp-Logan,\ L=wmax/2$ 





Manual filtering:Cosine Filter, L=wmax Manual filtering:Cosine Filter, L=wmax/2

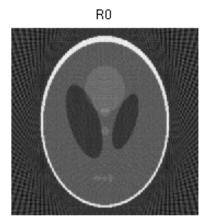




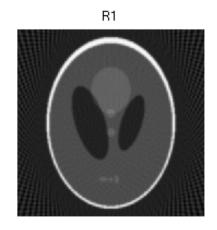
### PartB: Backprojection of noisy image

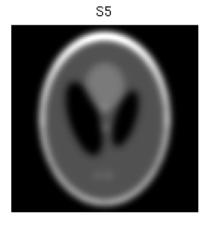
```
[S0,S1,S5,R0,R1,R5,rrmse1,rrmse2,rrmse3] = partB(img);
figure('Name', 'PartB: No Noise, S0 and R0');
subplot(1,2,1);imagesc( S0 ); title('S0')
colormap(gray(256)); axis image; axis off
subplot(1,2,2);imagesc( R0 ); title('R0')
colormap(gray(256)); axis image; axis off
disp('RRMSE for i=0');
disp(rrmsel);
figure('Name','PartB: S1 and R1');
subplot(1,2,1);imagesc( S1 ); title('S1')
colormap(gray(256)); axis image; axis off
subplot(1,2,2);imagesc( R1 ); title('R1')
colormap(gray(256)); axis image; axis off
disp('RRMSE for i=1');
disp(rrmse2);
figure('Name','PartB: S5 and R5');
```

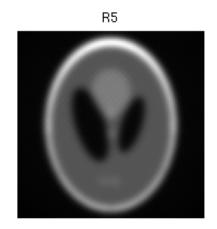












# Part C: plots (takes about 15 min for all the three plots to get executed)

partC(img);
toc;

PartC takes around 10min to execute fully

Elapsed time is 442.322557 seconds.

