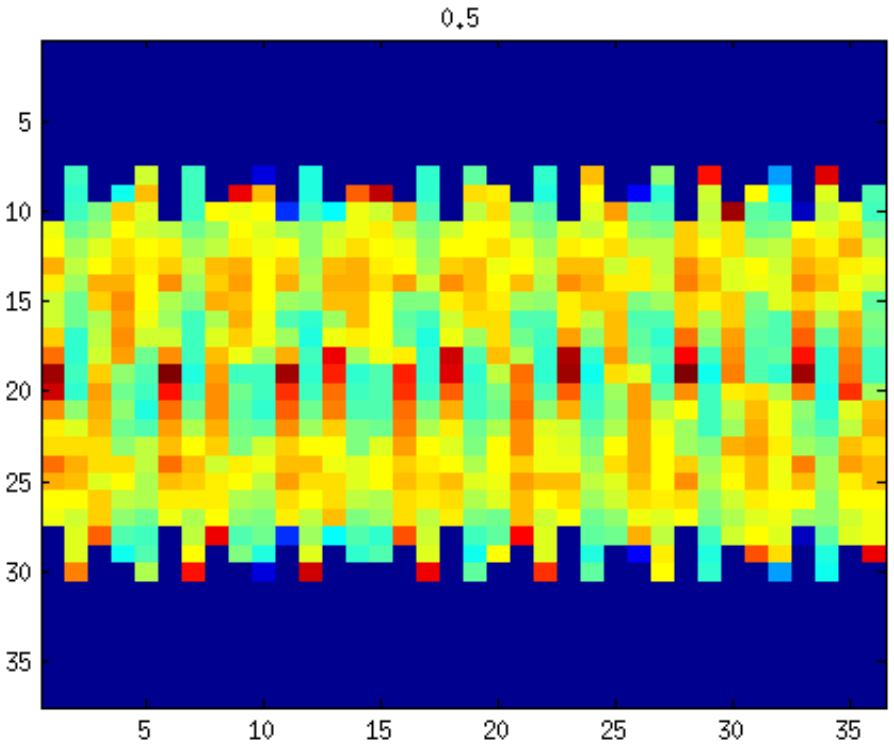
CS 736: Medical Image Processing Assignment 1 Aditya Kumar Akash 120050046, Praveen Agrawal 12D020030

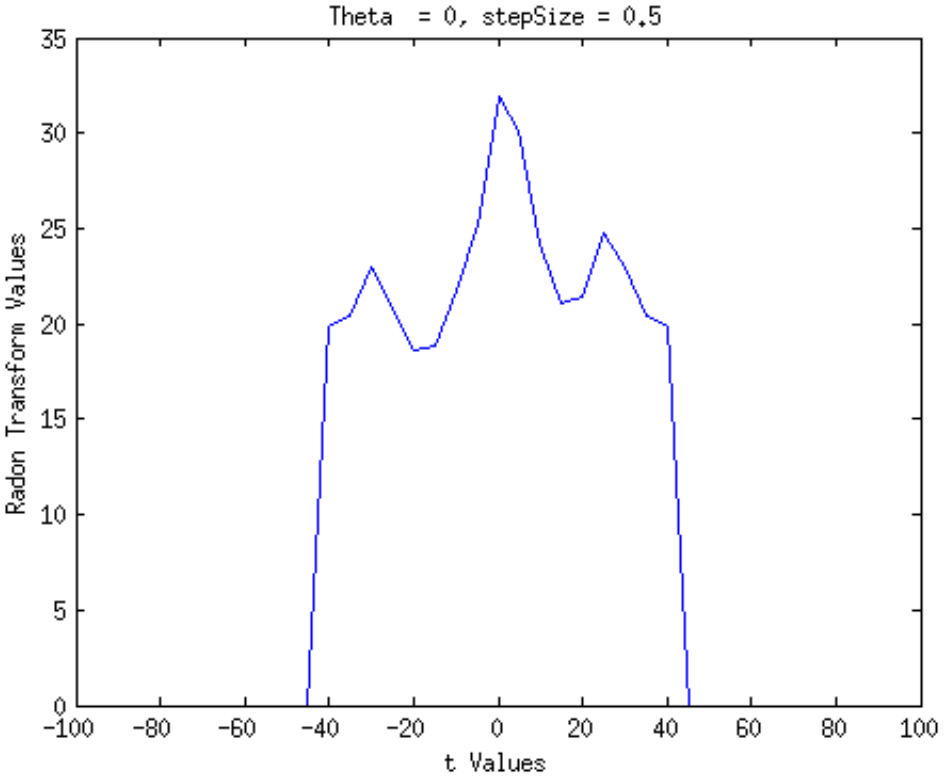
Question 1 Part (a) The step size is kept as a parameter. This is to allow us to use the function with different values of step size without changing any code. For the interpolation function, we have selected cubic interpolation.The reason linear interpolation causes some softening of details and can somewhat jagged. But cubic interpolation takes care of these.

```
% Part (b,c)
tic;
f = phantom(128);
t = [-90 : 5 : 90];

ds = 0.5;
rT1 = myRadonTrans(f, ds);
figure;
imagesc(rT1);
title(num2str(ds), 'FontWeight', 'bold');
save ('../Output Images/radonTransform_0.5stepSize', 'rT1');
rt0 = rT1(:, 1);
rt90 = rT1(:, 19);
figure;
plot(t, rt0);
title('Theta  = 0, stepSize = 0.5', 'FontWeight', 'bold');
xlabel('t Values');
ylabel('Radon Transform Values');
figure;
plot(t, rt90);
title('Theta  = 90, stepSize = 0.5', 'FontWeight', 'bold');
xlabel('t Values');
ylabel('Radon Transform Values');



ds = 1.0;
rT2 = myRadonTrans(f, ds);
figure;
imagesc(rT2);
title(num2str(ds), 'FontWeight', 'bold');
save ('../Output Images/radonTransform_1.0stepSize', 'rT2');
rt0 = rT2(:, 1);
rt90 = rT2(:, 19);
figure;
plot(t, rt0);
title('Theta  = 0, stepSize = 1.0', 'FontWeight', 'bold');
xlabel('t Values');
ylabel('Radon Transform Values');
figure;
plot(t, rt90);
title('Theta  = 90, stepSize = 1.0', 'FontWeight', 'bold');
xlabel('t Values');
ylabel('Radon Transform Values');



ds = 3.0;
rT3 = myRadonTrans(f, ds);
figure;
```

```
imagesc(rT3);
title(num2str(ds), 'FontWeight', 'bold');
save ('../Output Images/radonTransform_3.0stepSize', 'rT3');
rt0 = rT3(:, 1);
rt90 = rT3(:, 19);
figure;
plot(t, rt0);
title('Theta  = 0, stepSize = 3.0', 'FontWeight', 'bold');
xlabel('t Values');
ylabel('Radon Transform Values');
figure;
plot(t, rt90);
title('Theta  = 90, stepSize = 3.0', 'FontWeight', 'bold');
xlabel('t Values');
ylabel('Radon Transform Values');
toc;
```

```
Elapsed time is 868.096721 seconds.
```




Theta = 0, stepSize = 0.5
Radon Transform Values
t Values
35
30
25
20
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-40
-20
0
20
40
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80
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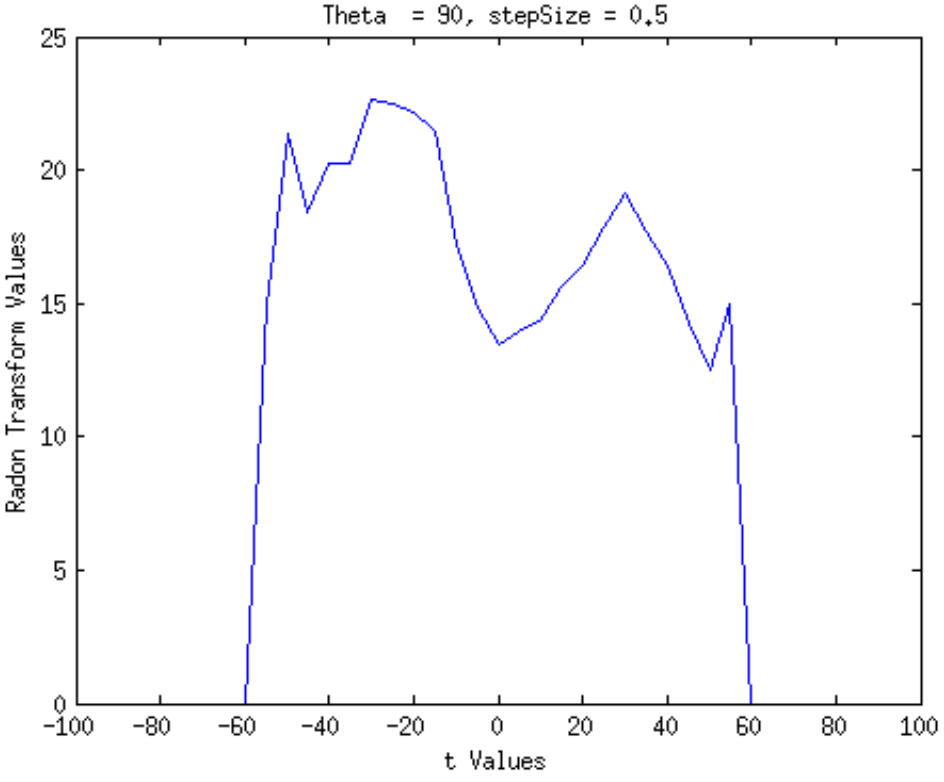
Theta = 90, stepSize = 0.5
Radon Transform Values
t Values
25
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15
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5
0
-100
-80
-60
-40
-20
0
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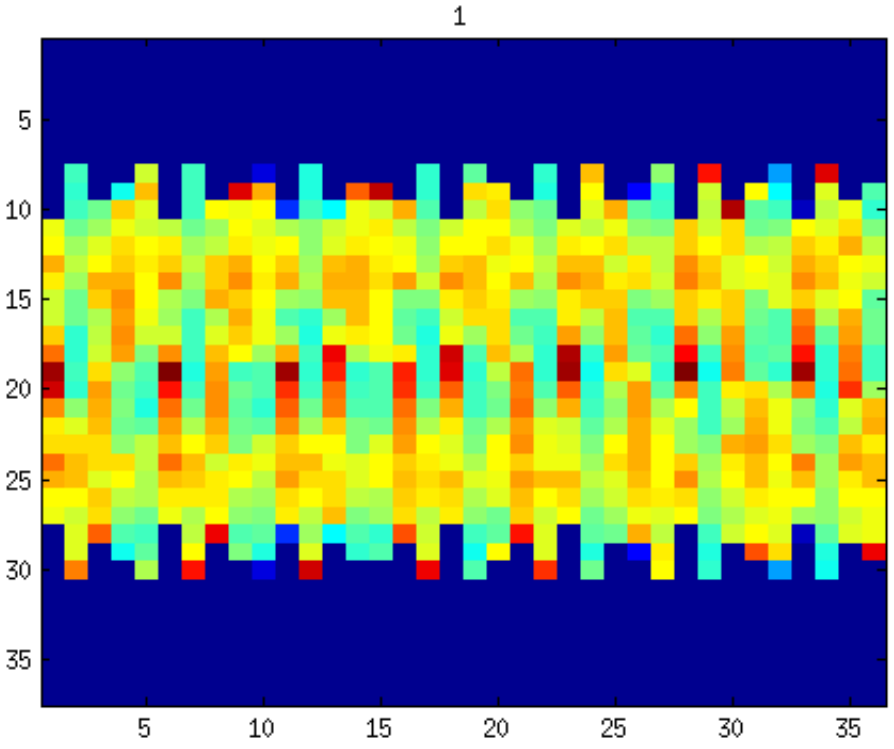
100


1
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25
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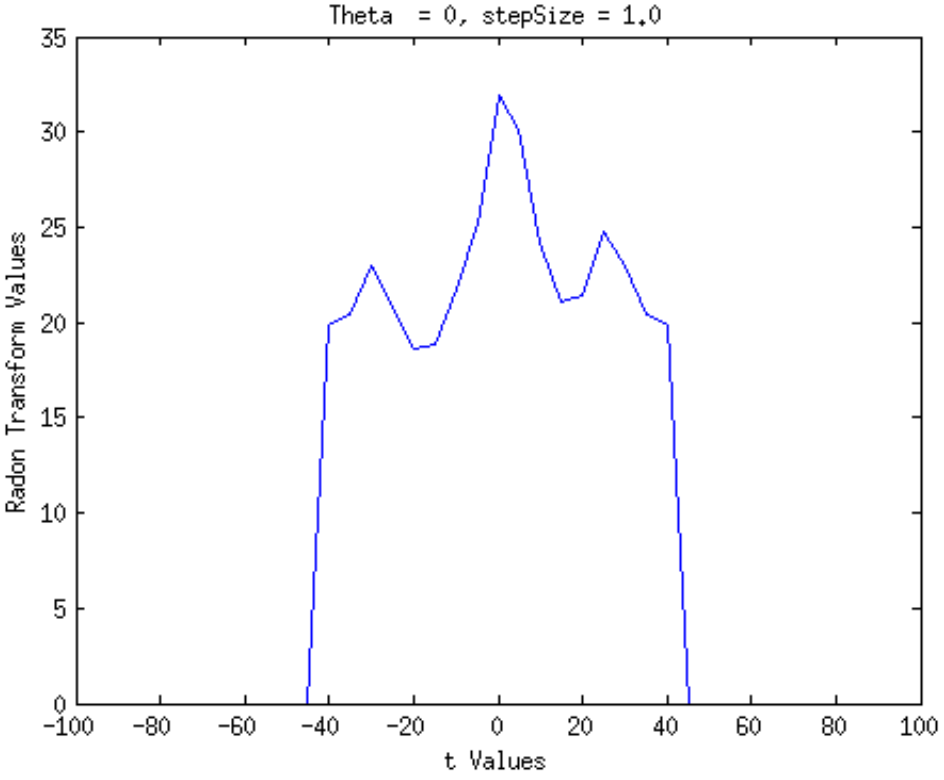
35


Theta = 0, stepSize = 1.0
Radon Transform Values
t Values
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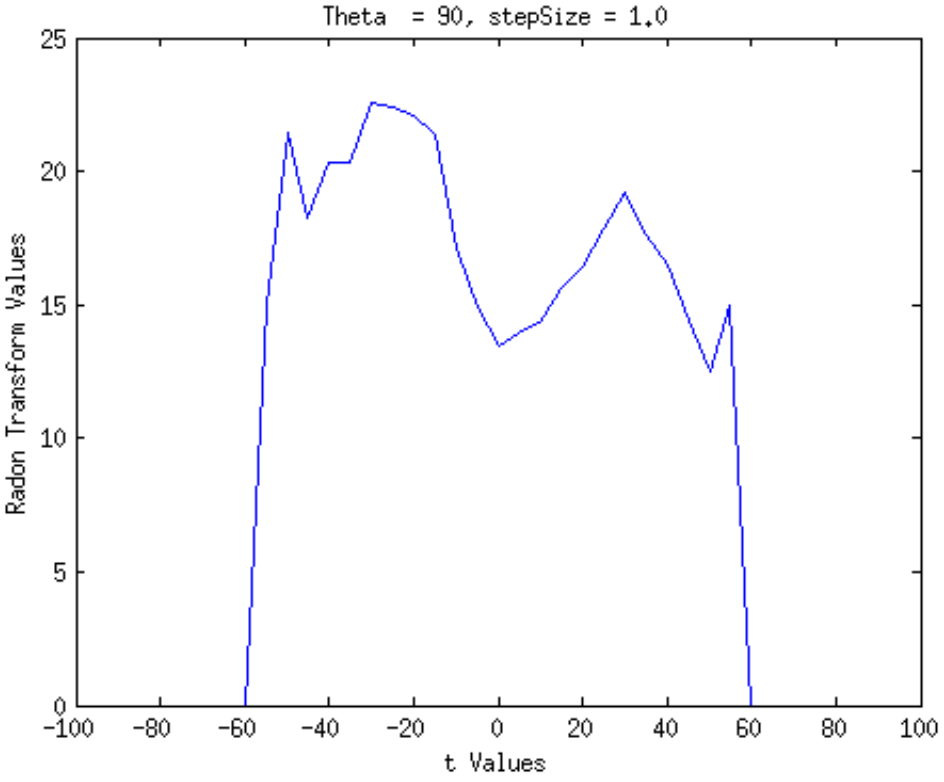
Theta = 90, stepSize = 1.0
Radon Transform Values
t Values
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-100
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-60
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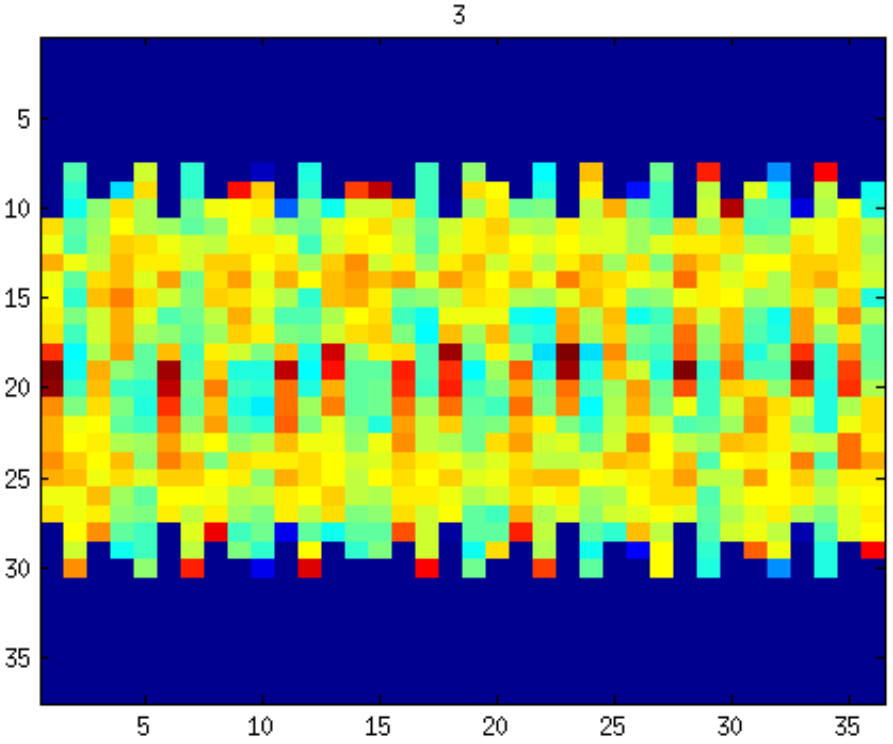
3
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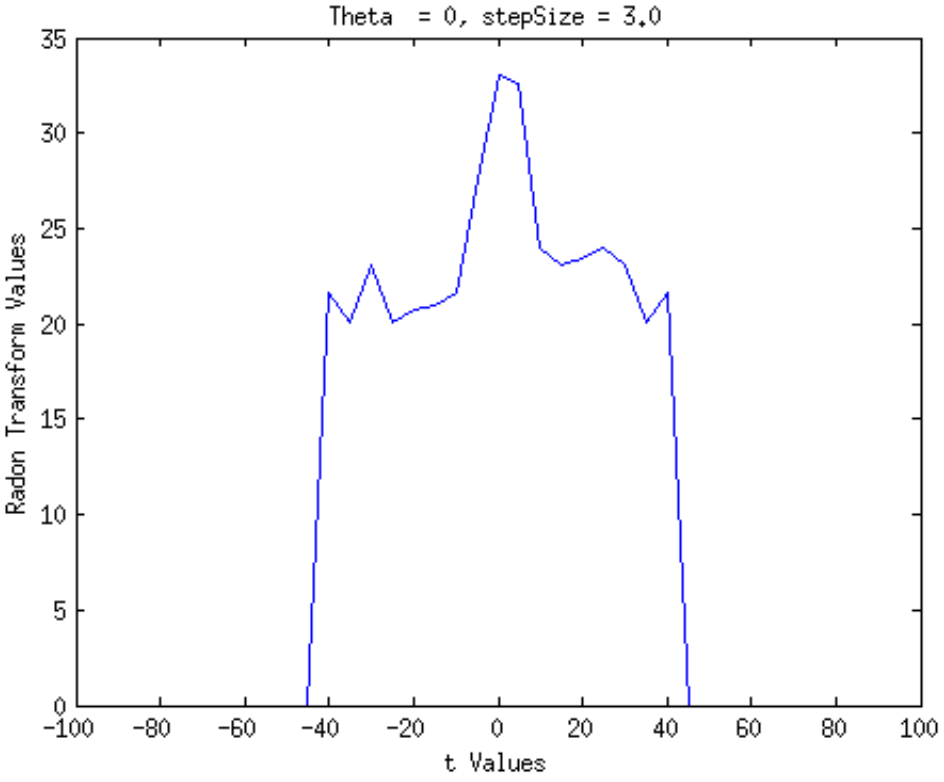

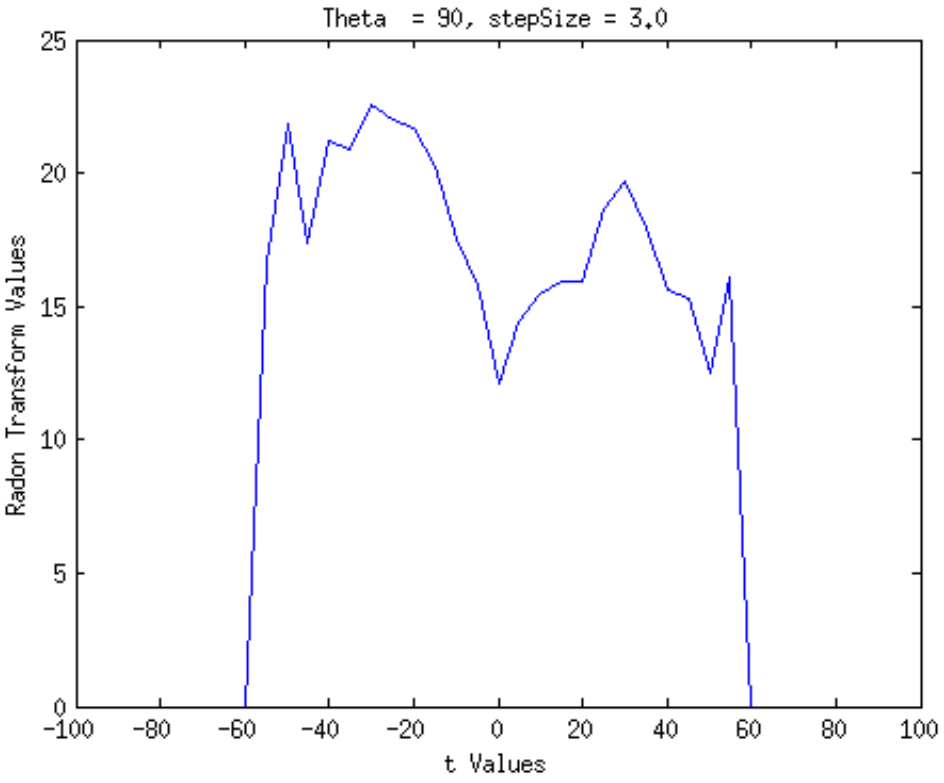

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