Lab 6 - Resampling

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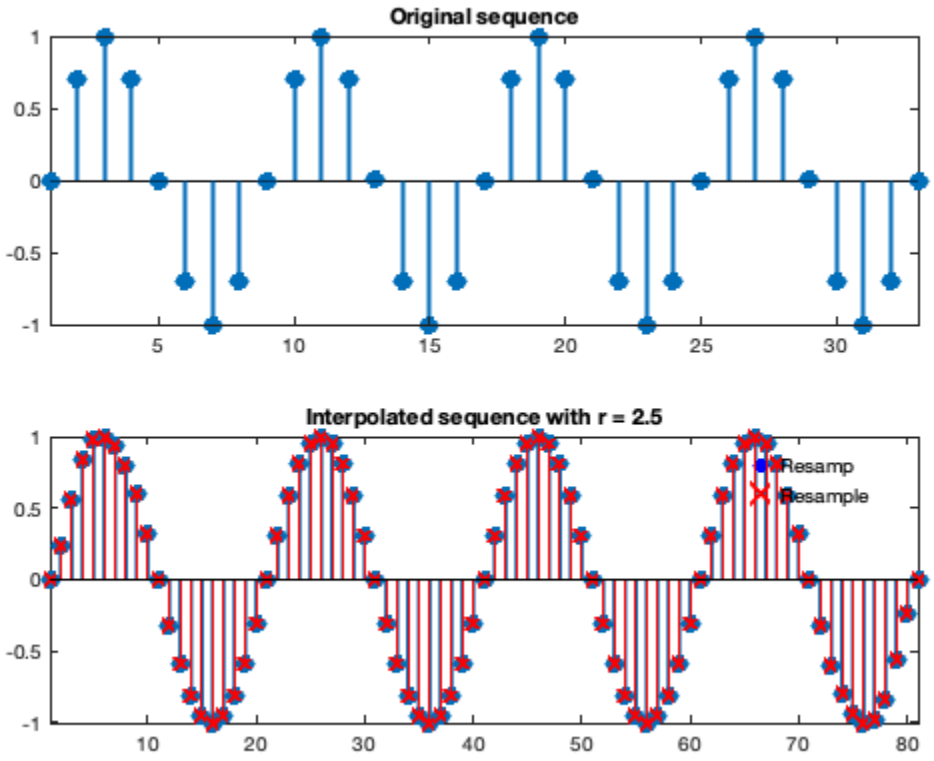
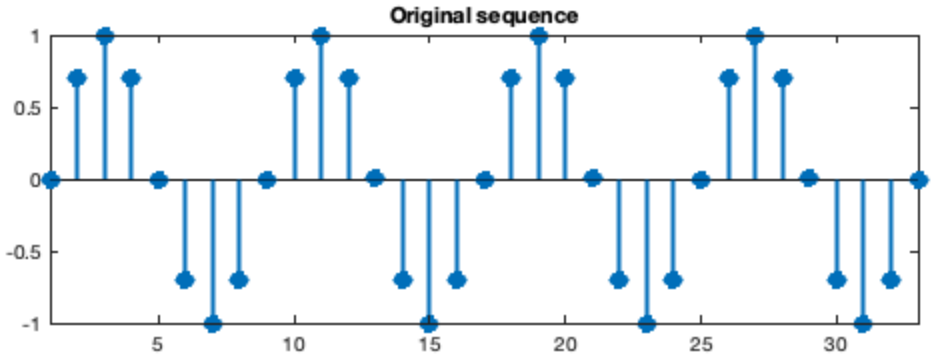
Testing resampling of a sin at (5/2)fs

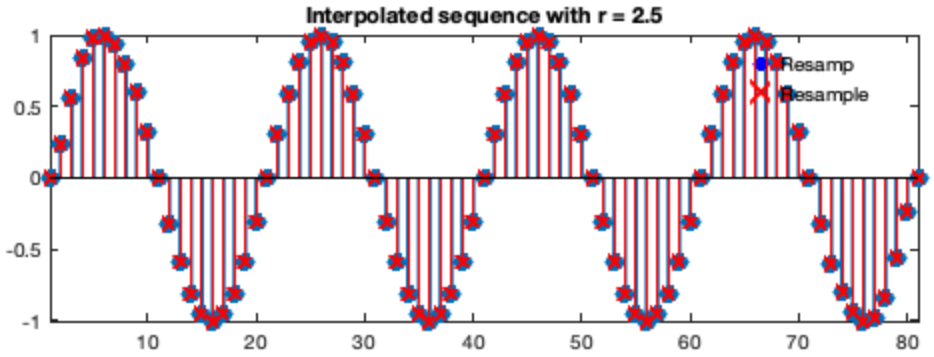
```
x = sin(2 * pi * (0:32) / 8);
test_resamp(x, 2.5);
```

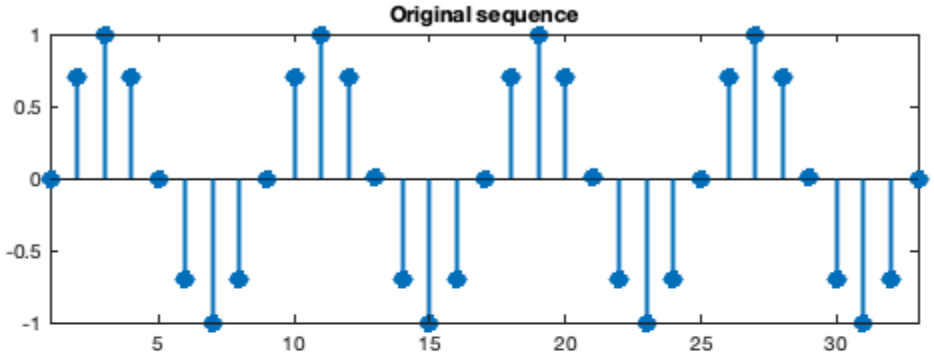


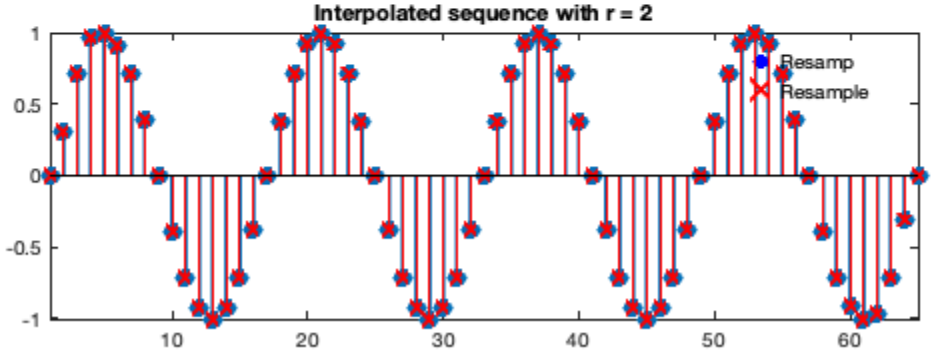
Testing resampling of a sin at 2fs

```
test_resamp(x, 2);
```


Original sequence
1
0.5
0
-0.5
-1
5
10
15
20
25
30

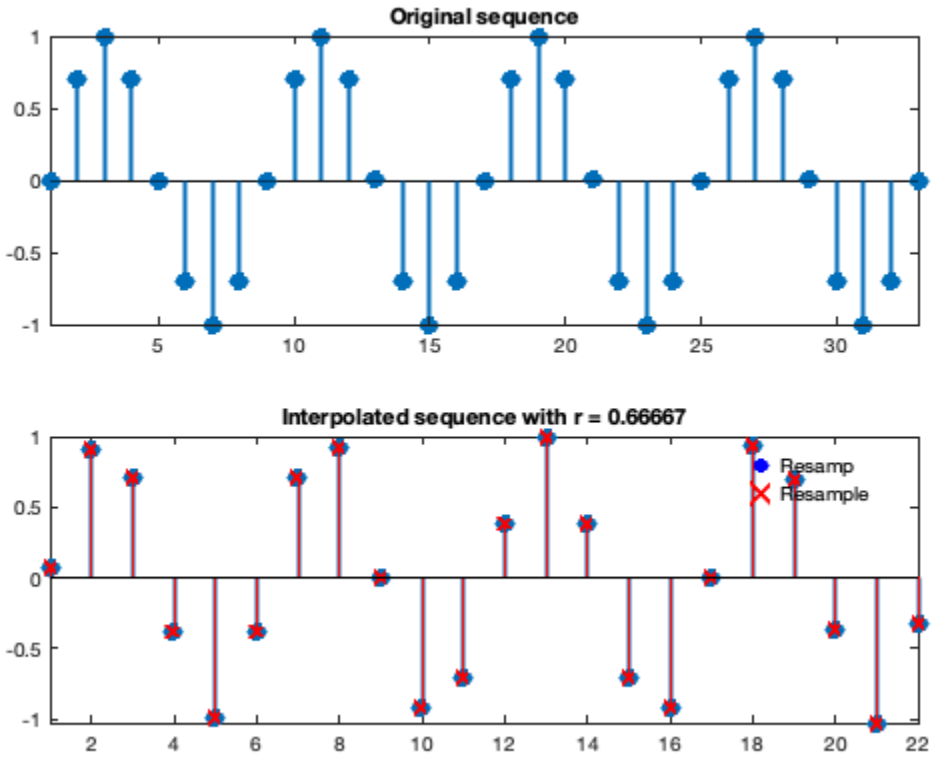

Interpolated sequence with r = 2.5
Resamp
Resample
1
0.5
0
-0.5
-1
10
20
30
40
50
60
70
80


Original sequence
1
0.5
0
-0.5
-1
5
10
15
20
25
30


Interpolated sequence with r = 2
Resamp
Resample
1
0.5
0
-0.5
-1
10
20
30
40
50
60

Testing resampling of a sin at (2/3)fs

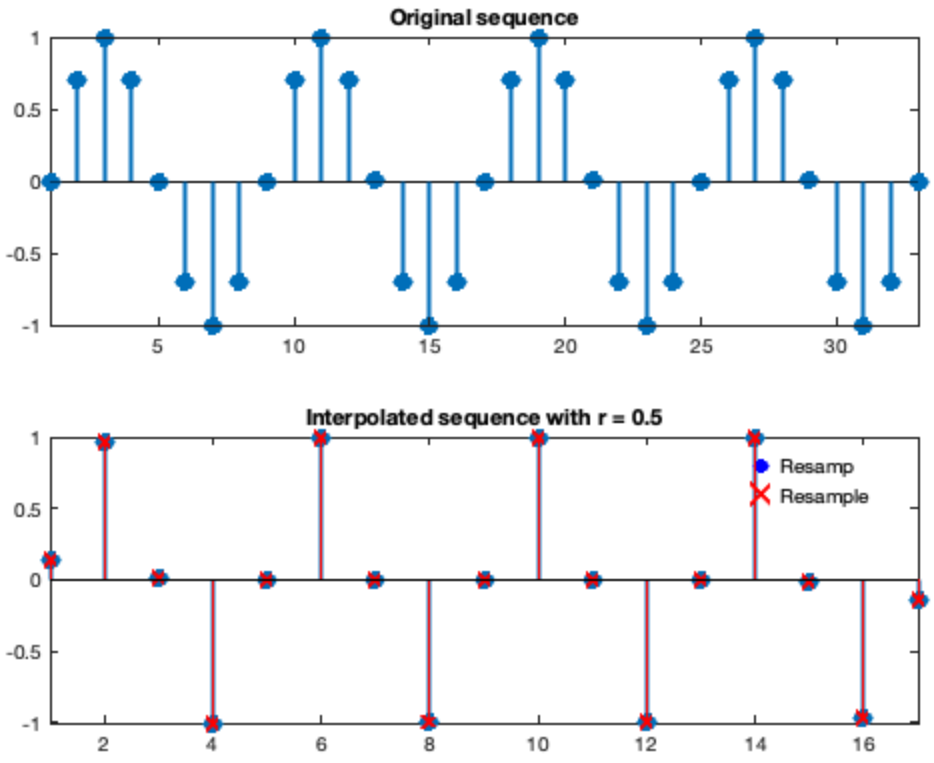
```
test_resamp(x, 0.666667);
```



Testing resampling of a sin at (1/2)fs

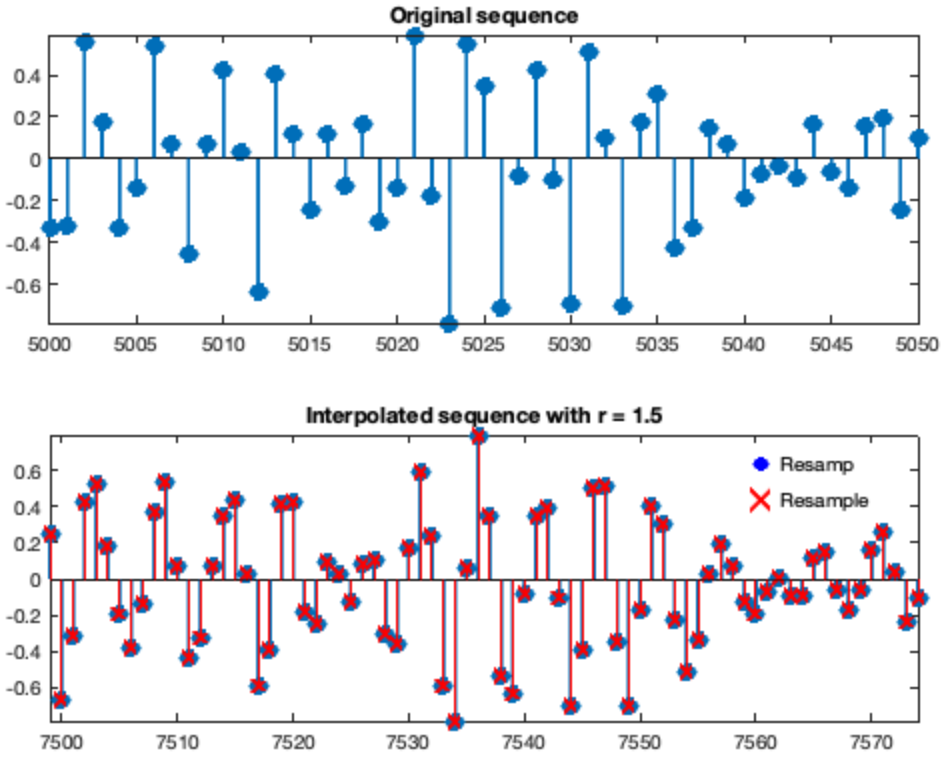
```
test_resamp(x, 0.5);

% Make sure that you have the file 'seashell.wav' in your directory
[x, fs] = audioread('seashell.wav');
```



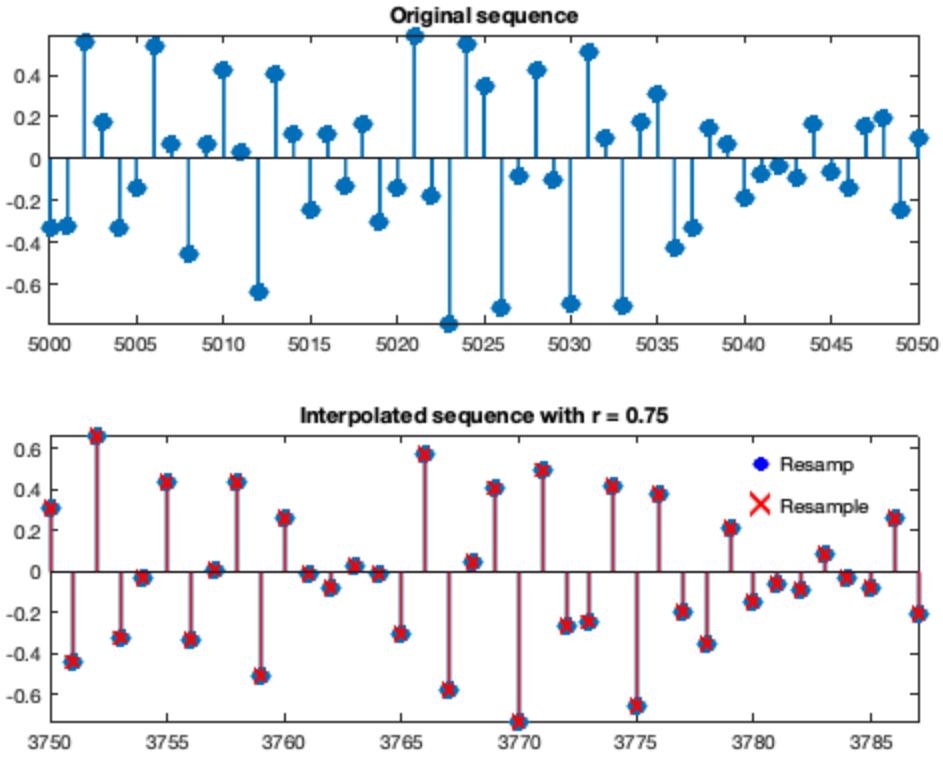
Testing resampling of 'seashell' at (3/2)fs

```
test_resamp(x, 1.5, 5000, 5050);
```



Testing resampling of 'seashell' at (3/4s)fs

```
test_resamp(x, 0.75, 5000, 5050);
```



Print program

```
disp(' ')
disp('--- resamp.m --------------------------------')
type('resamp')
```

```
--- resamp.m --------------------------------

function y = resamp(x, r)
% RESAMP Resample an input sequence x by a factor of r
%   to produce an output sequence y by a combination
%   of upsampling and downsampling.
%   For example,    y = resamp(x,1.5);
%   will upsample x by 3 and downsample by 2.

[L,M] = rat(r);
Lx = length(x);

x_up = zeros(1,Lx*L);
x_up(1:L:end) = x;  %upsample

wc = max(L,M);
fn = 1/wc;
n = round(1+20/fn);
h = L*fir1(n-1, fn, kaiser(n,5));
```

```
x_filt = conv(x_up, h, 'same');
y = x_filt(1:M:end);    %downsample

end
```

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