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Signal Processing Lab

Subject- Digital Signal Processing

EXPERIMENT NO. 10

Aim: Performing Upsampling (or Interpolation) and Downsampling (or Decimation) on Scilab.

Software Used: Scilab software.

Code:

```
//Down Sampling (or Decimation)

xn = input('Enter the number of samples xn: ');//[1 2 3 4 5 6 7 8]
N = length(xn);
n = 0:1:N-1;
D = 3;
xDn = xn(1:D:N);
n1 = 1:1:N/D;
//figure;
disp(xDn, 'The downsampling or Decimation for D = 3 is:------>')

//Up Sampling (or Interpolation)
yn = input('Enter the number of samples yn: ')///[1 -2 3 4 8 9 10 44]

N = length(yn)
n = 0:1:N-1
I = 2
xIn = [zeros(1, I*N)]
n1 = 1:1:N*I
j = 1:I:I*N
xIn(j) = yn
disp(xIn, 'The upsampling or interpolation for I = 2 is:----->')
```

Output:

```
Enter the number of samples xn: [1 2 3 4 5 6 7 8]


 The downsampling or Decimation for D = 3 is:------>

   1.    4.    7.
Enter the number of samples yn: [1 -2 3 4 8 9 10 44]


 The upsampling or interpolation for I = 2 is:----->

   1.    0.   -2.    0.    3.    0.    4.    0.    8.    0.    9.    0.    10.    0.    44.    0.

-->
```

Conclusion:

In this experiment we learnt how to perform upsampling and downsampling on Scilab.The process of converting the sampling rate of a digital signal from one rate to another is Sampling Rate Conversion. Increasing the rate of already sampled signal is upsampling whereas decreasing the rate is called downsampling.