

Signal Reconstruction II

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Code

This was the code used to achieve the goals outlined in the lab procedure.

```
na = [0:0.01:1];
nb = [0:0.1:1];
ya = cos(20*pi*na);
yb = cos(20*pi*nb);
figure; hold on;
% plot sampled signals
subplot(2,1,1);
stem(na, ya, 'b');
xlabel('n'); ylabel('x[n]');
title('Case_1_Sampled_Signal');
subplot(2,1,2);

stem(nb, yb, 'r');
xlabel('n');
ylabel('x[n]');
title('Case_2_Sampled_Signal');

% sinc reconstruction t = [0:0.001:1];
xr1 = mysinc(ya, 0.01, t);
xr2 = mysinc(yb, 0.1, t);
% plot sinc recon figure;
subplot(2,1,1);
plot(t, xr1, 'b');
title('sinc_reconstruction_case_1');
xlabel('t'); ylabel('reconstructed_x(t)');
subplot(2,1,2);
plot(t, xr2, 'r');
title('sinc_reconstruction_case_2');
xlabel('t'); ylabel('reconstructed_x(t)');

% zero order hold % plot zoh reconsutrction figure;
subplot(2,1,1);
stairs(na, ya, 'b');
title('zoh_reconstruction_case_1');
xlabel('t'); ylabel('reconstructed_x(t)');
subplot(2,1,2); stairs(nb, yb, 'r');
title('zoh_reconstruction_case_2');
xlabel('t'); ylabel('reconstructed_x(t)');

% first order hold figure
subplot(2,1,1);
plot(na, ya, 'b');
```

```

title('foh_reconstruction_case_1');
xlabel('t'); ylabel('reconstructed_x(t)');
subplot(2,1,2); plot(nb, yb, 'r');
title('foh_reconstruction_case_2');
xlabel('t'); ylabel('reconstructed_x(t)');

% cubic spline interpolation
figure; xx = 0:0.01:1;
yy1 = spline(na, ya, xx); yy2 = spline(nb, yb, xx);
subplot(2,1,1); plot(xx1, yy1, 'b');
subplot(2,1,2); plot(xx, yy2, 'r');
% function defs
function xr = mysinc(x, Ts, t)
Fs = 1/Ts;
xr = zeros(size(t));
for n = 1:length(x)
xr = xr + x(n) * sinc(Fs * (t - n*Ts));
end
end

```

Figures

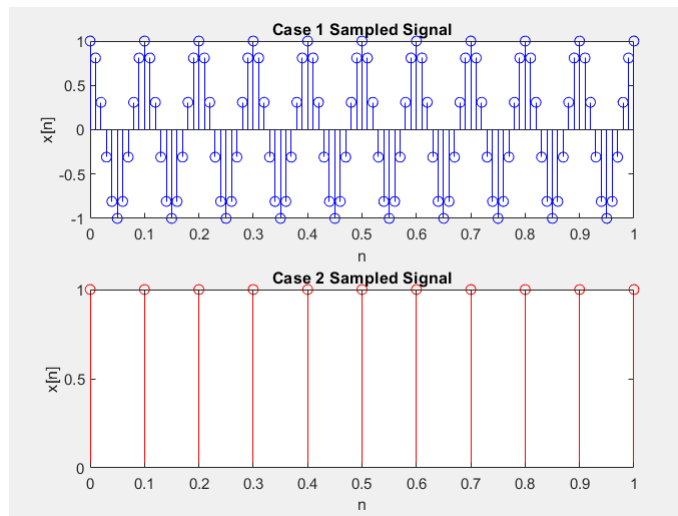


Figure 1:

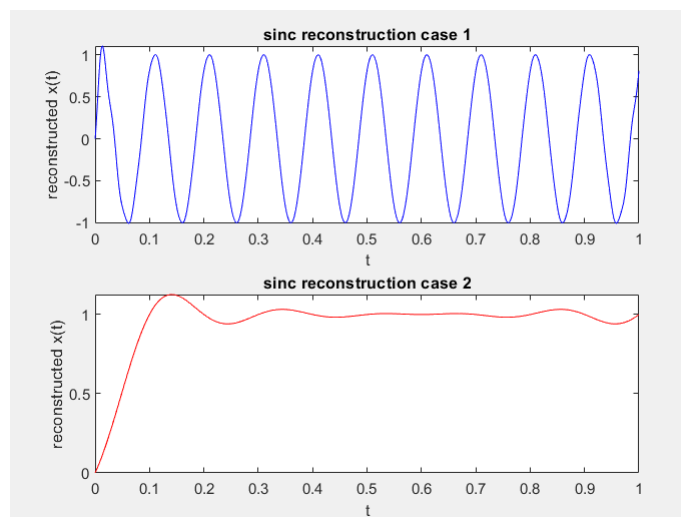


Figure 2:

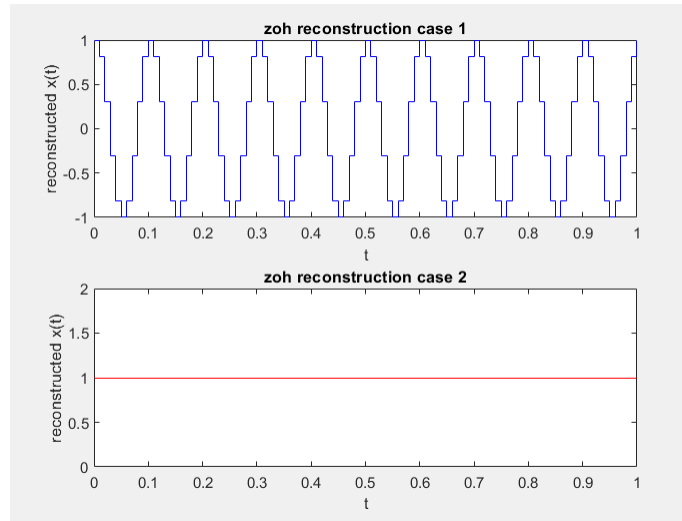


Figure 3:

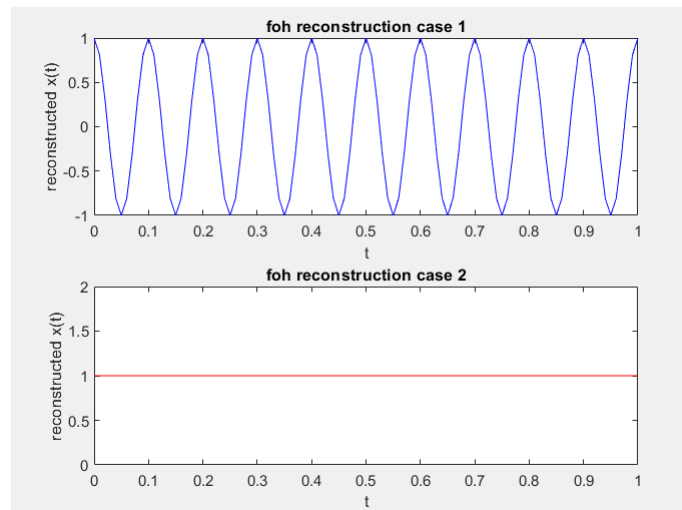


Figure 4:

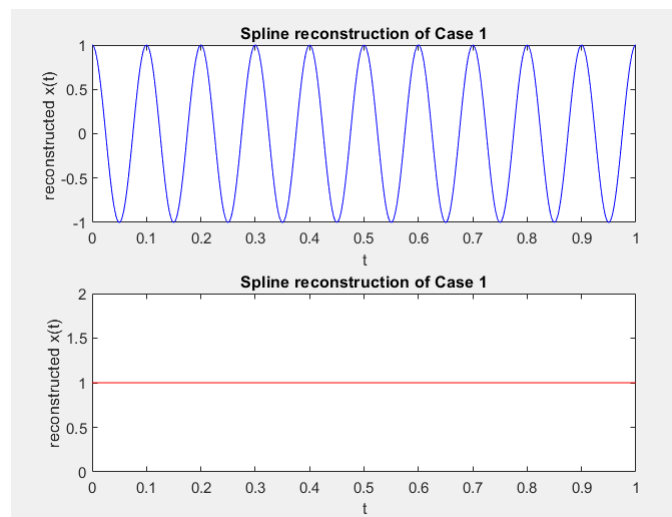


Figure 5: