

```
% Set the sample start and stop times

ti = 164;
to = 180;

% calculate the sample vectors
ts = t(ti*25:to*25);
xs = x(ti*25:to*25);
ys = y(ti*25:to*25);
zs = z(ti*25:to*25);

% %Plot the sample data
% plot(ts,xs,ts,ys,ts,zs)
% legend('X','Y','Z')
% xlabel('Time (Seconds)')
% ylabel('Force Gs')
% xmean = ones(1,length(ts))*mean(xs);
% plot(ts,xmean);

%detect peaks in the sample data
[x_pks, x_locs] = findpeaks(xs,'MINPEAKDISTANCE',d);

%Turn peak locations from being relative to absolute samples
i=1;
x_peaks=[];
while i<length(x_locs);
    temp =[t(x_locs(i)+ti*25); x_pks(i)];
    x_peaks =[ x_peaks temp];
    i = i+1;
end;

% %plot peaks ontop of sample data
% plot(x_peaks(1,:),x_peaks(2,),'k.');
```

%make sure the sample range is divisible by 2, so that you don't catch half
%a sample in the next block of code when you look at every other peak.

```
e = length(x_peaks);
if mod(length(x_peaks),2) == 1;
    x_peaks = x_peaks(:,1:e-1);
end

%create a vector for the sample data with every other value removed,
%becuase there are two peaks per cycle, not one
b = x_locs(1:2:end);

%load the data for each cycle withn the data sample into a single arraay
i = min(b);
j = 1;
```

```
k = 1;
avgsig = [];
while j <= length(b)-1;
    if i == b(j+1);
        j = j+1;
        k=1;
    end
    avgsig(j,k)=xs(i);
    i=i+1;
    k = k+1;
end

%delete the last row of the array, which is always 0s for some reason...
avgsig = avgsig(1:length(b)-1,:);

%plot the extracted signal samples on top of each other
figure
hold on
i = 1;
while i <= size(avgsig,1)
    plot(avgsig(i,:));
    i = i+1;
end

% %average the values in the array to produce a singal signal for the cycle
% i = 1;
% while i <= length(avgsig)
%     onesig(i) = mean(avgsig(:,i));
%     i = i+1;
% end
% plot(onesig,'r')
%
% %cross correlate the averaged sample signal with the original data
% xc = xcorr(x,onesig);
%
% %shorten the correlation vectors to remove 0s
% xc = xc(length(x):length(xc));
%
% %Normalize correltation vector amplitude to match axis amplitude
% xc = (xc/max(xc))*max(x);
%
% plot(t,xc,t,x)
```