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function [cycle] = peakpoints(vector)

%peakpoints finds maximum and minimum points in a vector.

% This code is developed to find peak points and number of cycles in
% seismic analysis of structures. However, it can be used for any vector.

%

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% peakdet function developed by Eli Billauer used in this code.

% http://www.billauer.co.il/peakdet.html

%%

% first define your vector, then use [cycle]=peakpoints(vector) in the command line;
% Example: import vector.txt to workspace and write peakpoints(vector)

%%

delta=0.1; % by default

v = vector(:)'; % Just in case this wasn't a proper vector

figure (1);
subplot(2,1,1); plot(v, '-k');

axis square; xlabel('Inc #'); ylabel('Vector'); title('Finding peak points');

x = (1:length(v))';

maxtab=[]; mintab=[];

mn = Inf; mx = -Inf;

mnpos = NaN; mxpos = NaN;

lookformax=1;

for vi=1:1:length(v);

    value=v(vi);

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    this=value;
if this > mx, mx = this; mxpos = x(vi); end
if this < mn, mn = this; mnpos = x(vi); end

if lookformax
    if this < mx-delta
        maxtab = [maxtab ;mxpos mx];
        mn = this; mnpos = x(vi);
        lookformax = 0;
    end
else
    if this > mn+delta
        mintab = [mintab ; mnpos mn];
        mx = this; mxpos = x(vi);
        lookformax = 1;
    end
end
end

for imin=1:1:length(mintab);
    cycle(mintab(imin,1),1)=mintab(imin,2);
end

for imax=1:1:length(maxtab);
    cycle(maxtab(imax,1),1)=maxtab(imax,2);
end

figure (1);

hold on; subplot(2,1,1); plot(mintab(:,1),mintab(:,2),'ro'); subplot(2,1,1);
plot(maxtab(:,1),maxtab(:,2),'ro');

cycle(cycle==0) = [];

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```
cycle=[0; cycle];  
% cycle1=round(cycle);  
figure (1);  
subplot(2,1,2); plot(cycle,'-ro'); %figure (3); plot(cycle1,'--ko');  
axis square; xlabel('cycle #'); ylabel('Vector'); title('cycle');
```