SIGNALS AND SYSTEMS

MINI PROJECT

TOPIC:- PEAK ANALYSIS USING MATLAB

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What is peak analysis?
To determine the period of a signal by measuring the distance between the peaks, and find peaks in a noisy signal using a processing toolbox

What are sunspots?

Sunspots are phenomena on the Sun's photosphere that appear as temporary spots that are darker than the surrounding areas.

The peaks of a signal are most noticeable and useful features. And for that reason, peak analysis is an important area of signal processing. You may want to find out how many peaks are there in the signal, how far apart they are from each other, or whether they follow some kind of pattern

CODE:-

```matlab
%% Load signal and plot
load sunspot.dat
ln= plot(sunspot(:,1),sunspot(: ,2)) ;
set(ln,'Color',[ 0 0.4 0.7] );
box on,grid on;
title ( 'Sunspots observed in last 300 years ') ;
```
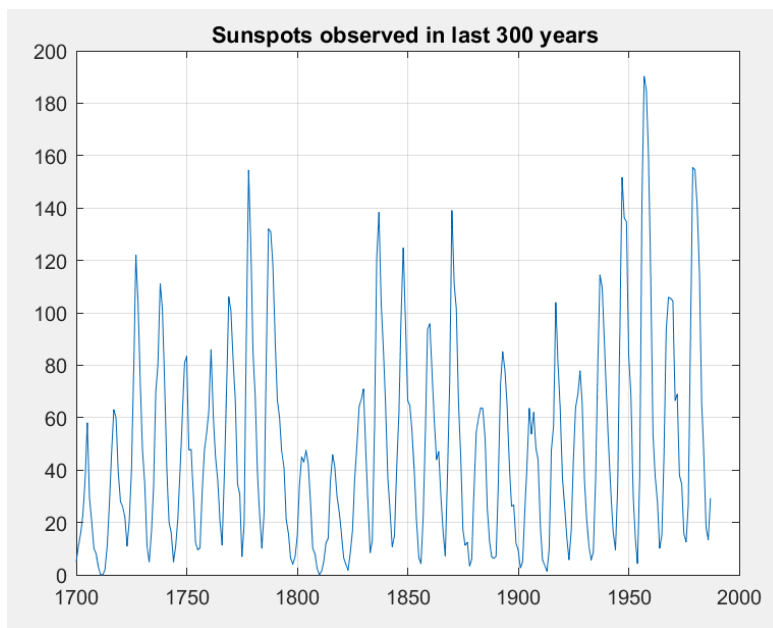


```matlab
%% Findpeaks
findpeaks(sunspot(:,2));
title('Peaks in sunspot Data');
```

Peaks in sunspot Data
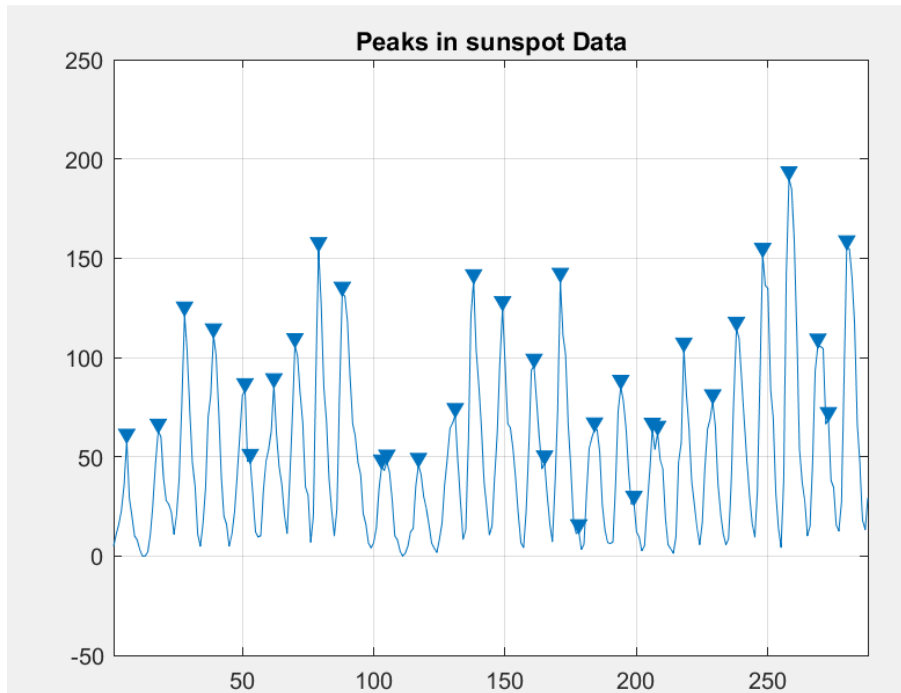
```
%%Limits the number of peaks displayed
findpeaks(sunspot(:, 2),'Npeaks',15 )
title('First 15 peaks in sunspot data');
xlim ([0 150]);
```


First 15 peaks in sunspot data
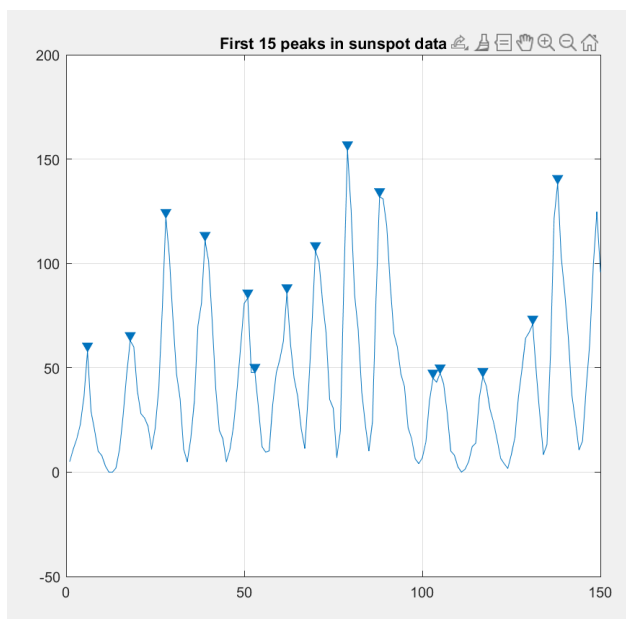
```
%%Frequency of sunspot activity occurence
yr=sunspot (:,1); sunspotNum=sunspot (:,2);
[peakVal, locVal]= findpeaks(sunspot (:, 2),'MinPeakDistance', 6);
yr (locVal)'

sunSpotPeak=mean(diff(locVal));
display (sprintf('\nSunspot Activity peaks every %f years on an average. \n',
sunSpotPeak));
```

```
ans =

  Columns 1 through 5

        1705        1717        1727        1738        1750

  Columns 6 through 10

        1761        1769        1778        1787        1804

  Columns 11 through 15

        1816        1830        1837        1848        1860

  Columns 16 through 20

        1870        1883        1893        1905        1917

  Columns 21 through 25

        1928        1937        1947        1957        1968


Sunspot Activity peaks every 10.960000 years on an average.
```

CONCLUSION:-

Hence we have successfully marked all the peaks of the sun spots of 15 years and also found out the that in every 10.96 year the sunspot activity peaks.

REFERENCES:-

https://fr.mathworks.com/help/signal/ug/find-peaks-in-data.html