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TO FIND THE ENERGY OF A SIGNAL IN DIGITAL IMAGE PROCESSING USING MATLAB

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ABSTRACT
Signals are measurable quantities used to express information about instance varying physical phenomenon. In this paper, we will use MATLAB settings to apply this. We mean to discover the Energy of a signal in MATLAB that can detect energy in diversity of demanding real world scenarios.

Keywords: *Digital Image Processing, Energy, Signals, MATLAB*

1. INTRODUCTION

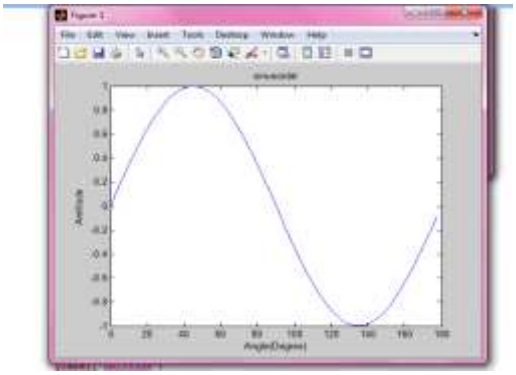
Digital Image Processing refers to dispensation of digital descriptions by way of a digital processor. Digital image can be different as two dimensional function f(x,y) and the amplitude of f at some position of the image.

In this paper, we will use MATLAB settings. The image processing tool box is a set of MATLAB functions that expand the ability of MATLAB Settings for fast prototyping, completion and testing of the image Processing. We mean to discover the Energy of a signal in MATLAB that can detect energy in diversity of demanding real world scenarios. These scenarios are planned for testing arrangement. We aim to find the power and energy of the signal using MATLAB

For finding the energy of the signal, Sinusoidal wave has been generated in MATLAB. The code is as follows:

```
xAxis= 0:0.1:2*pi;
yAxis=sin(xAxis);
plot(xAxis,yAxis)
xlabel('Angle(radian)')
ylabel('Amlitude')
title('sinusoidal')

xDegree= 90/pi*xAxis;
plot(xDegree,yAxis)

xlabel('Angle(Degree)')
ylabel('Amlitude')
title('sinusoidal');
```

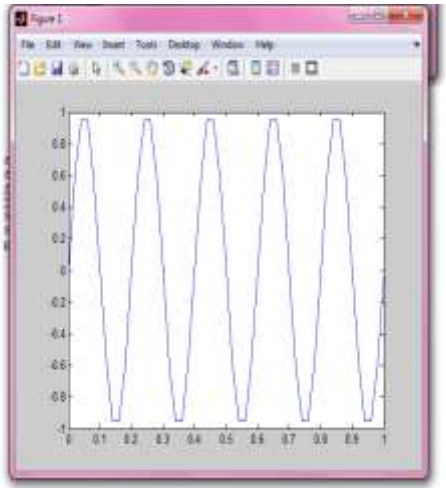
output:



For finding the energy, two signal signal1signal 2 has been created as follows:

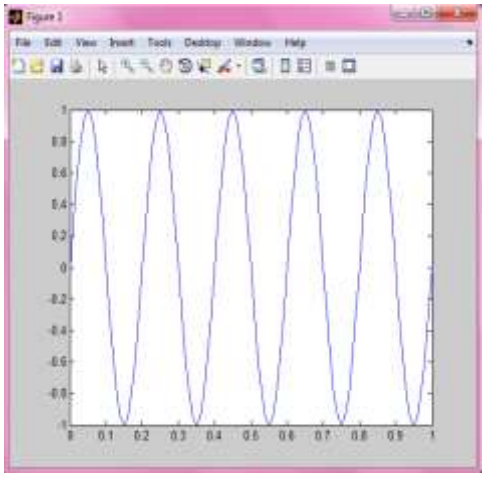
```
f1=5;
f2=3;
fs=50;
TimeAxis=0:1/fs:1;
Signal1=sin(2*pi*f1*TimeAxis);
Signal2=sin(2*pi*f2*TimeAxis);
plot(TimeAxis,Signal1)
```

output:



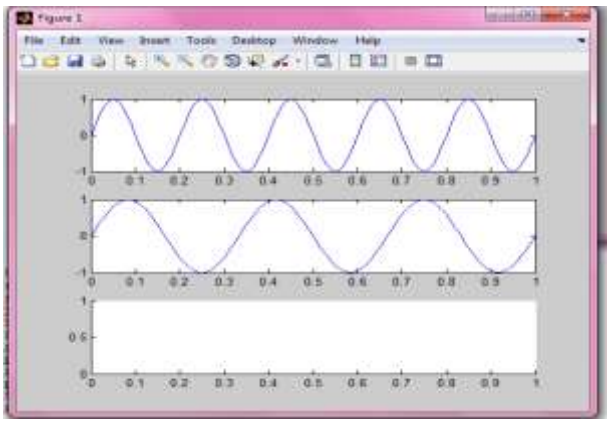
Output:

```
f1=5;
f2=3;
fs=100;
TimeAxis=0:1/fs:1;
Signal1=sin(2*pi*f1*TimeAxis);
Signal2=sin(2*pi*f2*TimeAxis);
plot(TimeAxis,Signal1)
```



```
f1=5;  % frequency1 %
f2=3;  % frequency2 %
fs=100; % Sampling frequency1 %
TimeAxis=0:1/fs:1;   %Time Axis 1 second %
Signal1=sin(2*pi*f1*TimeAxis);  % first signal %
Signal2=sin(2*pi*f2*TimeAxis);  % second signal %

%plotting%
subplot(311)
plot(TimeAxis,Signal1)
subplot(312)
plot(TimeAxis,Signal2)
Signal3=Signal1+Signal2;
subplot(313)
```

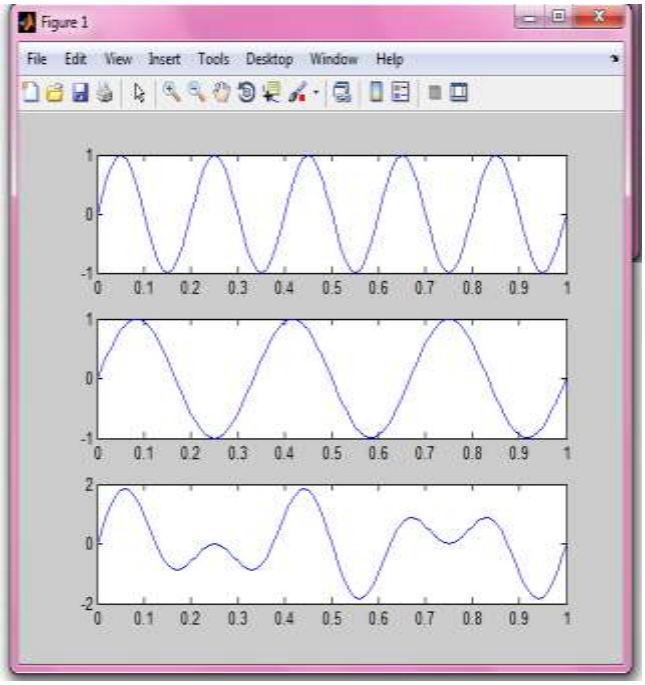
Two signals signal1 , signal2 has been generated on time axis.



```
f1=5; % frequency1 %
f2=3; % frequency2 %
fs=100; % Sampling frequency1 %
TimeAxis=0:1/fs:1; %Time Axis 1 second %
```

```
Signal1=sin(2*pi*f1*TimeAxis);  % first signal %
Signal2=sin(2*pi*f2*TimeAxis);   % second signal %
subplot(311)

%plotting%

plot(TimeAxis,Signal1)
subplot(312)
plot(TimeAxis,Signal2)
Signal3=Signal1+Signal2;
subplot(313)
plot(TimeAxis,Signal3)
```

Therefore, signal 3 has been generated as with signal1, signal 2 as shown below.



Now, three signal has been generated, signal1, signal2,signal3 .

For finding the energy

$$E = \int_0^T s^2(t)dt$$

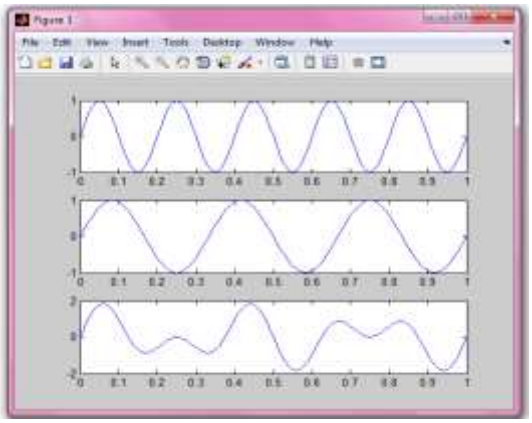
The following code is :

```
f1=5; % frequency1 %
f2=3; % frequency2 %
fs=100; % Sampling frequency %
TimeAxis=0:1/fs:1; %Time Axis 1 second %
```

```
Signal1=sin(2*pi*f1*TimeAxis);  % first signal %
Signal2=sin(2*pi*f2*TimeAxis);   % second signal %
subplot(311)

%plotting%

plot(TimeAxis,Signal1)
subplot(312)
plot(TimeAxis,Signal2)
Signal3=Signal1+Signal2;
subplot(313)
plot(TimeAxis,Signal3)
%finding the signal energy %
dt=1/fs;
Energy1=sum(Signal1.^2)*dt
Energy2=sum(Signal2.^2)*dt
Energy3=sum(Signal3.^2)*dt
```

Output:

```
Energy1 =

    0.5000

Energy2 =

    0.5000

Energy3 =

    1.0000
```



2. CONCLUSION

We mean to discover the Energy of a signal in MATLAB that can detect energy in diversity of demanding real world scenarios.

REFERENCES

1. *http://dsp.stackexchange.com/questions/18126/calculating-power-and-energy-of-a-signal-in-matlab*
2. *http://www.gaussianwaves.com/2010/01/calculating-power-and-energy-content-of-a-signal-in-matlab-2/*