

```
%Matlab program to find fourier series
disp("Name : Krish prajapati , prn : 124b1d002")
```

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```
syms x pi
syms n integer
f = input("Enter periodic funtion","s");
f = str2sym(f)
```

$f = x$

```
a = input("Enter the lower value of interval")
```

$a = -\pi$

```
b = input("Enter the higher value of interval")
```

$b = \pi$

```
L= (b-a)/2
```

$L = \pi$

```
g = subs(f,x,-x)
```

$g = -x$

```
if a == -b && f == g
    disp("Even funtion")
elseif a == -b && f == -g
    disp("Odd funtion")
else
    disp("The given funtion is neither even nor odd")
end
```

Odd funtion

```
disp("The fourier coeffient are ")
```

The fourier coeffient are

```
a0 = (1/L)*int(f,x,a,b)
```

$a0 = 0$

```
an = (1/L)*int(f*cospi(n*x/L),x,a,b)
```

$a_n = 0$

```
bn = (1/L)*int(f*sinpi(n*x/L),x,a,b)
```

$b_n =$

$$\frac{2\pi^2 \sin(\pi n) - 2\pi n \pi^2 \cos(\pi n)}{n^2 \pi \pi^2}$$

```
an = simplify(an)
```

```
an = 0
```

```
bn = simplify(bn)
```

```
bn =
```

$$-\frac{2(-1)^n \pi}{n \pi}$$

```
fs = (a0/2) + symsum(an*cos((n*pi*x))/L+bn*sin((n*pi*x)/L),n);
disp("The fourier series is ")
```

```
The fourier series is
```

```
f = fs
```

```
f =
```

$$\sum_n \left( -\frac{2(-1)^n \pi \sin(nx)}{n \pi} \right)$$