Chittagong University of Engineering And Technology

Department of Electrical and Electronic Engineering

Implementation of the pi series by using MATLAB

Submitted By,
Amit Debnath
ID: 1702009
Section: A
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0.1 Part 1

0.1.1 MATLAB Code and Output

```
clc;
clear all;
close all;
format long;
e = zeros(1,50);
for n=1:1:50
x=1;
for i=1:1:n
x = x*((2*i).^2)/(((2 * i) - 1) * ((2 * i) + 1));
end
e(n) = (2 * x) - pi;
end
plot(e);
xlabel('n'); ylabel('error'); title('output');
```

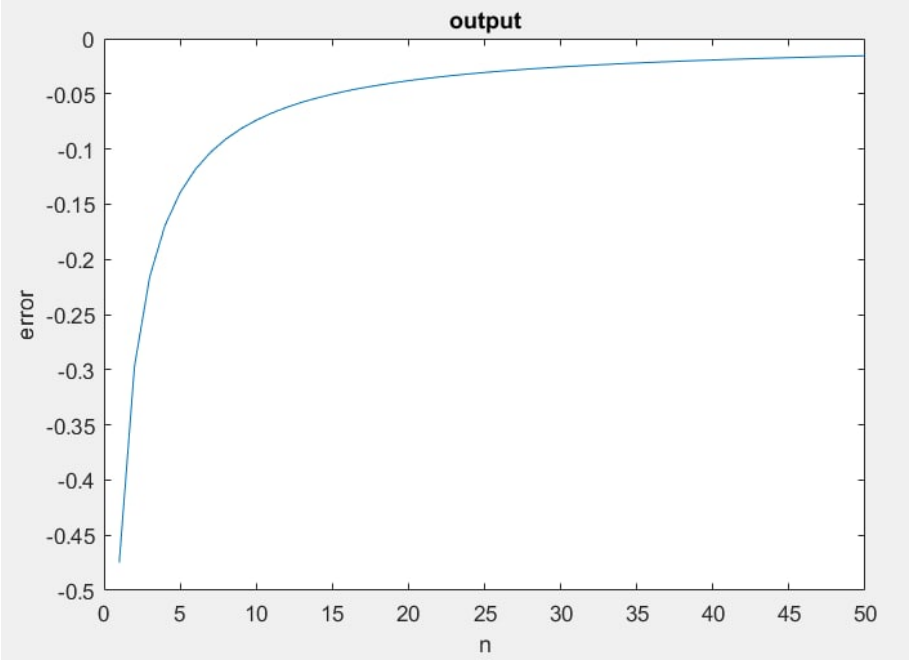

Figure 1: Output of part 1

0.2 Part 2

0.2.1 MATLAB CODE and Output

```
clc
clear all
close all
format long
e=zeros(1,50);
for n=1:1:50
if(n==1)
sum=(4/1); error=sum-pi; e(1)=error;
elseif (n==2)
x=(((2*(n-1))-1).^2)/2;
sum = 4/(1 + x); error = sum - pi; e(2) = error;
else
x = (((2 * (n - 1)) - 1).^2)/2;
for i = (n - 2) : -1 : 1
x = (((2 * i) - 1).^2)/(2 + x);
end
sum = 4/(1 + x); error = sum - pi; e(n) = error;
end
end
plot(e);
xlabel('n'); ylabel('error'); title('Output')
```

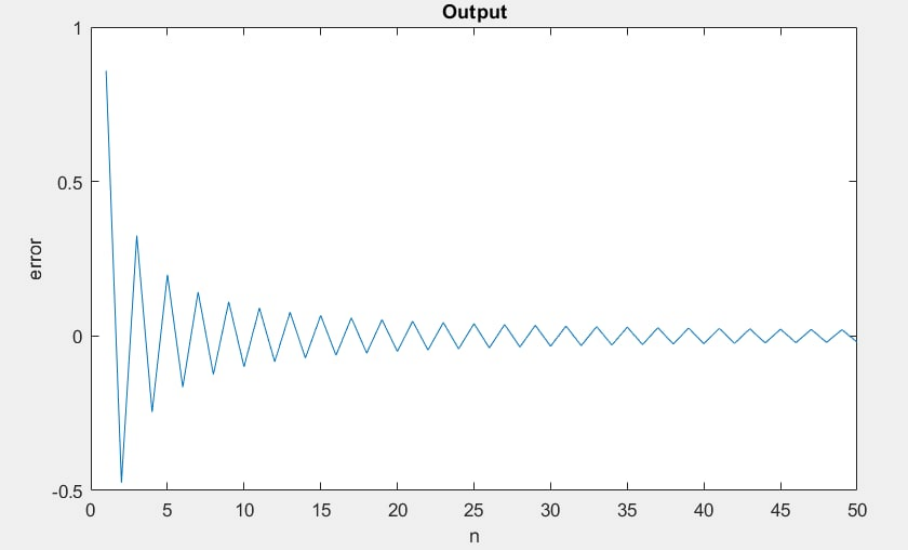

Figure 2: Output part 2

0.3 Part 3

0.3.1 MATLAB CODE and Output

```
clc
clear all
close all
error=zeros(1,50);

    for n=1:1:50
z=0;
for i=1:1:n
x= (2*i-1)*(-1)^(i + 1);
z = z + (1/x);
end
y = 4 * z;
error(n) = abs(y - pi);
end
plot(error);
xlabel('n'), ylabel('error'), title('Output');
```

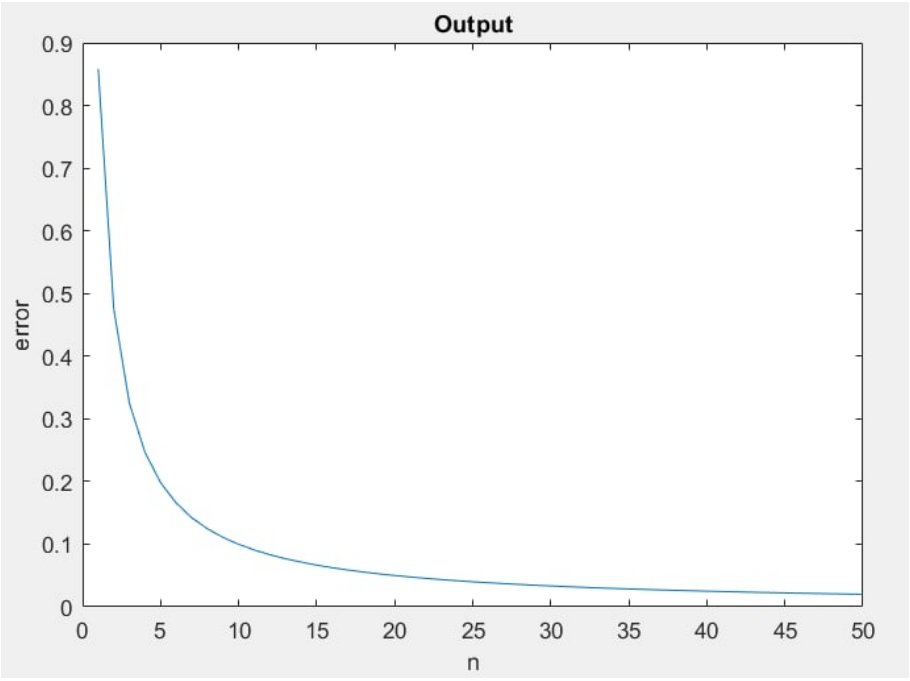

Figure 3: Output part 3

0.4 Part 4

0.4.1 MATLAB CODE and Output

```
clc
clear all
```

close all
sum=0
error=zeros(1,30);
for n=1:1:30
x=1
if n==1
x=x
else
for i=n:-1:2
x=x*(((2*i)-3).^2);
end
end
$z = (factorial(2 * n - 1)). * 2.^(2 * n - 1)$
$sum = sum + x/z$
$y = 6 * sum;$
$error(n) = abs((y - pi));$
end
$plot(error);$
$xlabel('n'); ylabel('error'); title('output')$

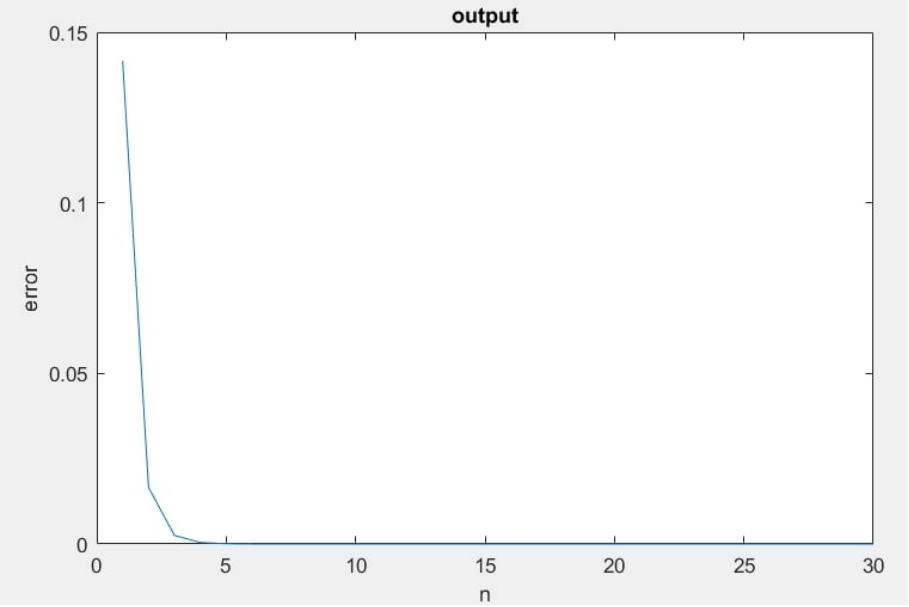

Figure 4: Output part 4

0.5 Part 5

0.5.1 MATLAB CODE and Output

clc;
clear all;
close all;
format long;

e = zeros(1,50);
for n=1:1:50
x=0;
for i=1:1:n
x = x+(1/(i.^2));
end
$e(n) = (sqrt(6 * x)) - pi;$
end
$plot(e);$
$xlabel('n'); ylabel('error'); title('output');$

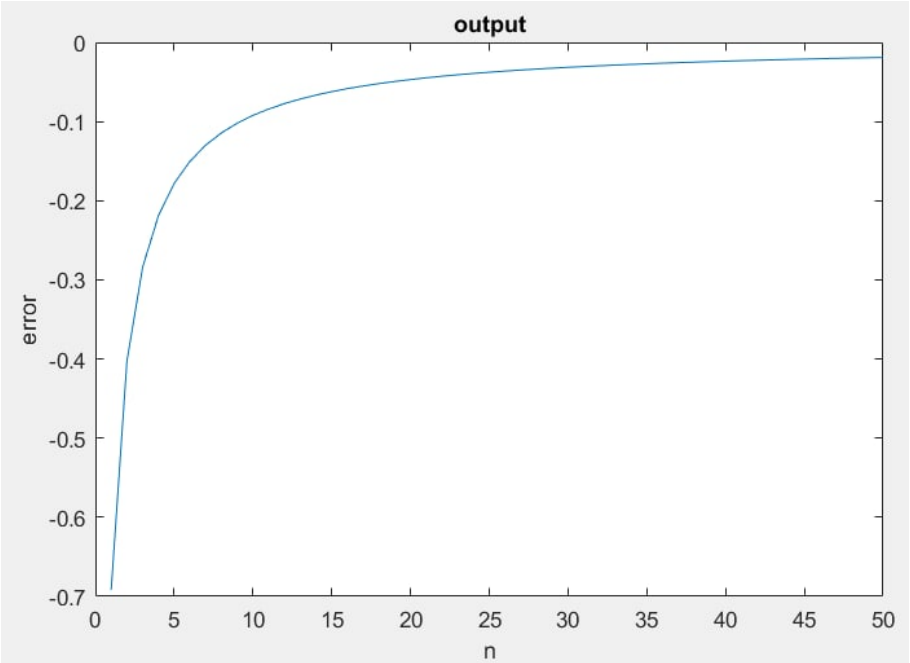

Figure 5: Output part 5

0.6 Part 6

0.6.1 MATLAB CODE and Output

clc;
clear all;
close all;
format long;
e = zeros(1,50);
e(1)=sqrt((6*(2.^2))/((2.^2) − 1)) − $pi;$
$forn = 2 : 1 : 50$
$x = (2.^2)/((2.^2) - 1);$
$fori = 2 : 1 : n$
$x = x * (((((2 * i) - 1)).^2)/((((2 * i) - 1).^2) - 1));$
end

$e(n) = (sqrt(6 * x)) - pi;$
end
$plot(e);$
$xlabel('n'); ylabel('error'); title('output');$

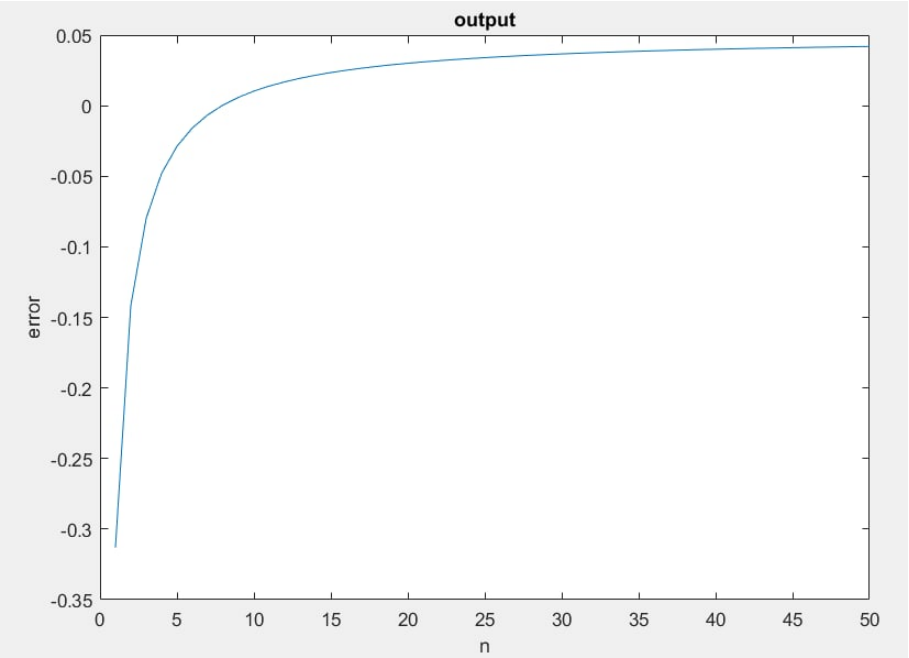

Figure 6: Output part 6