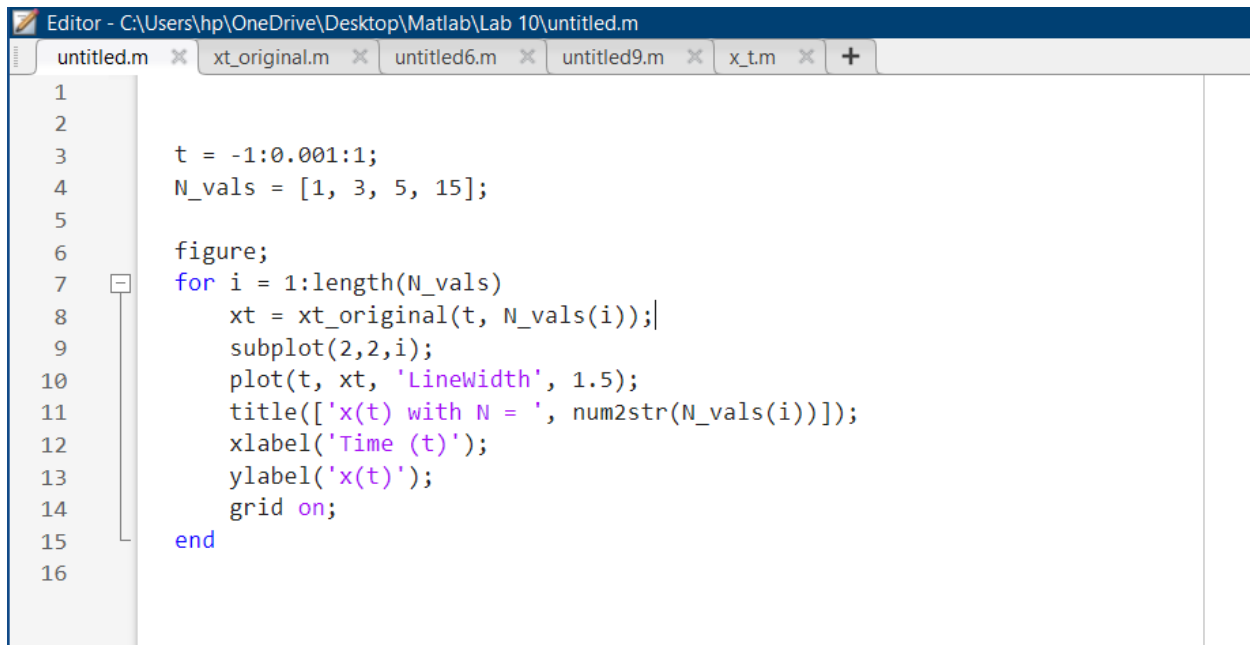


Lab 10

10.1

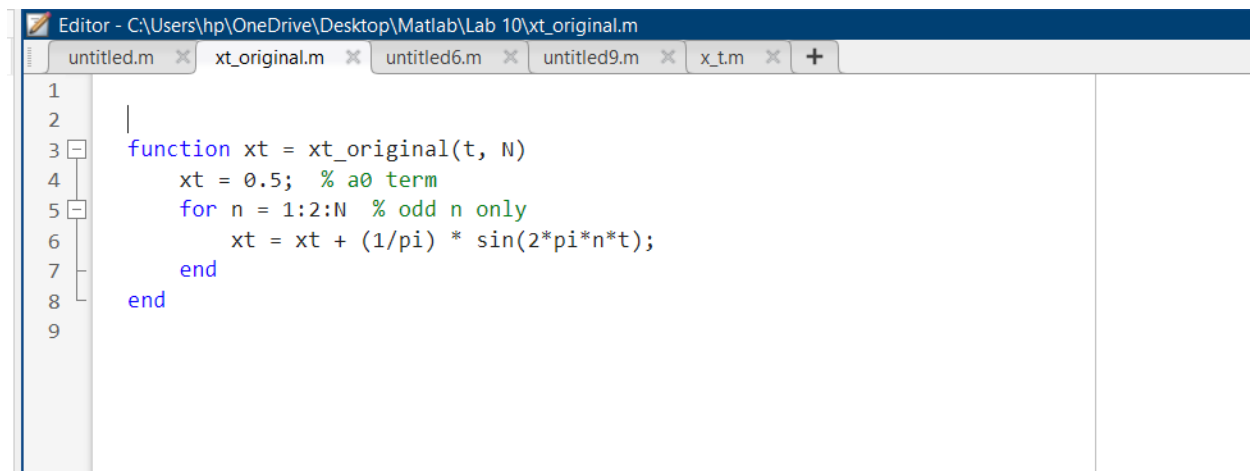
Generate Plots for Different N Values



The image shows a MATLAB Editor window with the title bar "Editor - C:\Users\hp\OneDrive\Desktop\Matlab\Lab 10\untitled.m". The window contains a script with the following code:

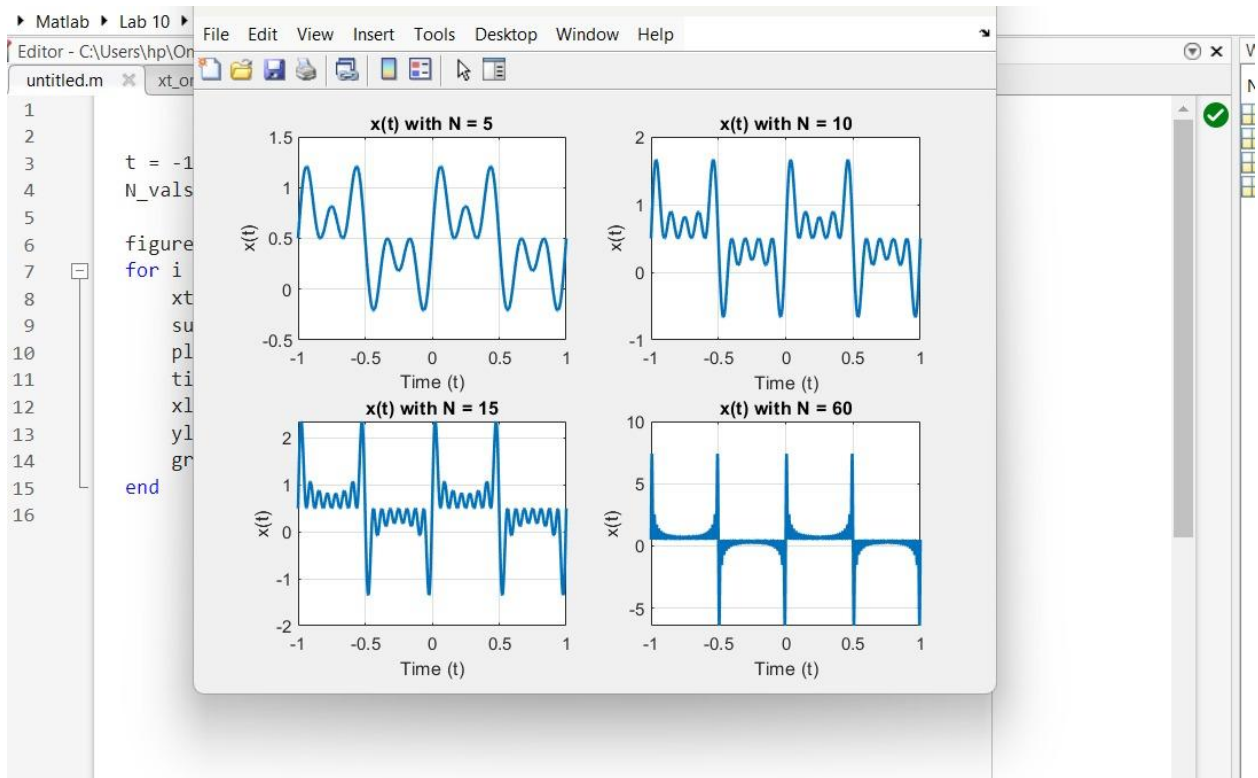
```
1
2
3     t = -1:0.001:1;
4     N_vals = [1, 3, 5, 15];
5
6     figure;
7     for i = 1:length(N_vals)
8         xt = xt_original(t, N_vals(i));
9         subplot(2,2,i);
10        plot(t, xt, 'LineWidth', 1.5);
11        title(['x(t) with N = ', num2str(N_vals(i))]);
12        xlabel('Time (t)');
13        ylabel('x(t)');
14        grid on;
15    end
16
```

MATLAB Function for $x(t)$



The image shows a MATLAB Editor window with the title bar "Editor - C:\Users\hp\OneDrive\Desktop\Matlab\Lab 10\xt_original.m". The window contains a function definition with the following code:

```
1
2
3     function xt = xt_original(t, N)
4         xt = 0.5; % a0 term
5         for n = 1:2:N % odd n only
6             xt = xt + (1/pi) * sin(2*pi*n*t);
7         end
8     end
9
```



10.2

MATLAB Function for $x(t)$

Editor - C:\Users\hp\OneDrive\Desktop\Matlab\Lab 10\fourier_series_xt.m

```
1 function x = fourier_series_xt(t, N)
2
3     x = zeros(size(t));
4     for n = 1:2:N
5         bn = (8/(pi^2)) * (1/n^2) * sin(n*pi/2);
6         x = x + bn * sin(n * pi * t);
7     end
8 end
```

Generate Plots for Different N Values

```
1 t = -2:0.0001:2;
2 N_values = [5, 10, 20, 65];
3
4
5 for i = 1:4
6     N = N_values(i);
7     x = fourier_series_xt(t, N);
8     subplot(2,2,i);
9     plot(t, x);
10    grid on;
11    xlabel(['x', num2str(i), '(t)']);
12    ylabel('Time(t)');
13    title(['Signal with terms up to ', num2str(N)]);
14 end
15
16
17
```

