

CODE:

```
n_values = -10:10;
complex_signal = exp((-0.1 + 1j * 0.3) * n_values);

signal_magnitude = abs(complex_signal);
signal_phase = angle(complex_signal);

figure;

subplot(2, 2, 1);
stem(n_values, real(complex_signal), 'filled');
title('Real Part of x(n)');
xlabel('n');
ylabel('Re{x(n)}');
grid on;

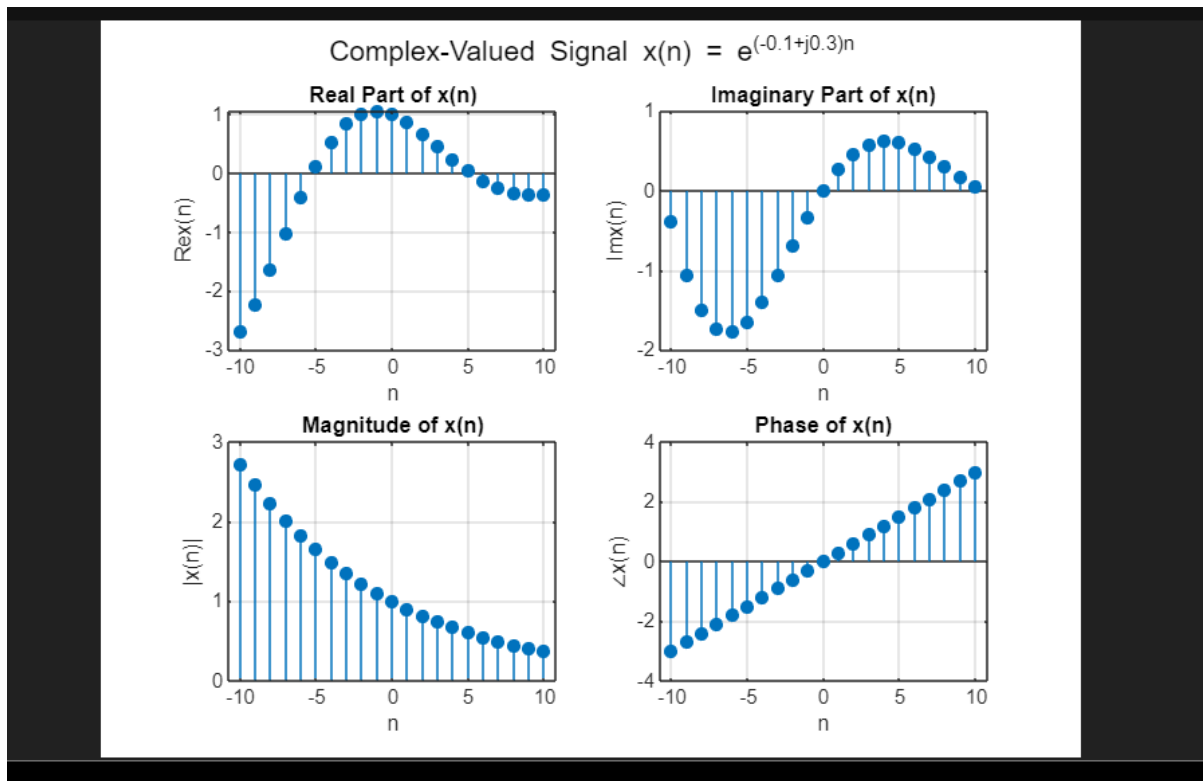
subplot(2, 2, 2);
stem(n_values, imag(complex_signal), 'filled');
title('Imaginary Part of x(n)');
xlabel('n');
ylabel('Im{x(n)}');
grid on;

subplot(2, 2, 3);
stem(n_values, signal_magnitude, 'filled');
title('Magnitude of x(n)');
xlabel('n');
ylabel('|x(n)|');
grid on;

subplot(2, 2, 4);
stem(n_values, signal_phase, 'filled');
title('Phase of x(n)');
xlabel('n');
ylabel('∠x(n)');
grid on;

sgtitle('Complex-Valued Signal x(n) = e^{(-0.1+j0.3)n}');
>>
```

OUTPUT:



CODE:

```
>> n_range = -10:10;
unit_step = @(n_range) double(n_range >= 0);
signal_x = unit_step(n_range) - unit_step(n_range - 10);
signal_x_reverse = fliplr(signal_x);
even_part = (signal_x + signal_x_reverse) * 0.5;
odd_part = (signal_x - signal_x_reverse) * 0.5;

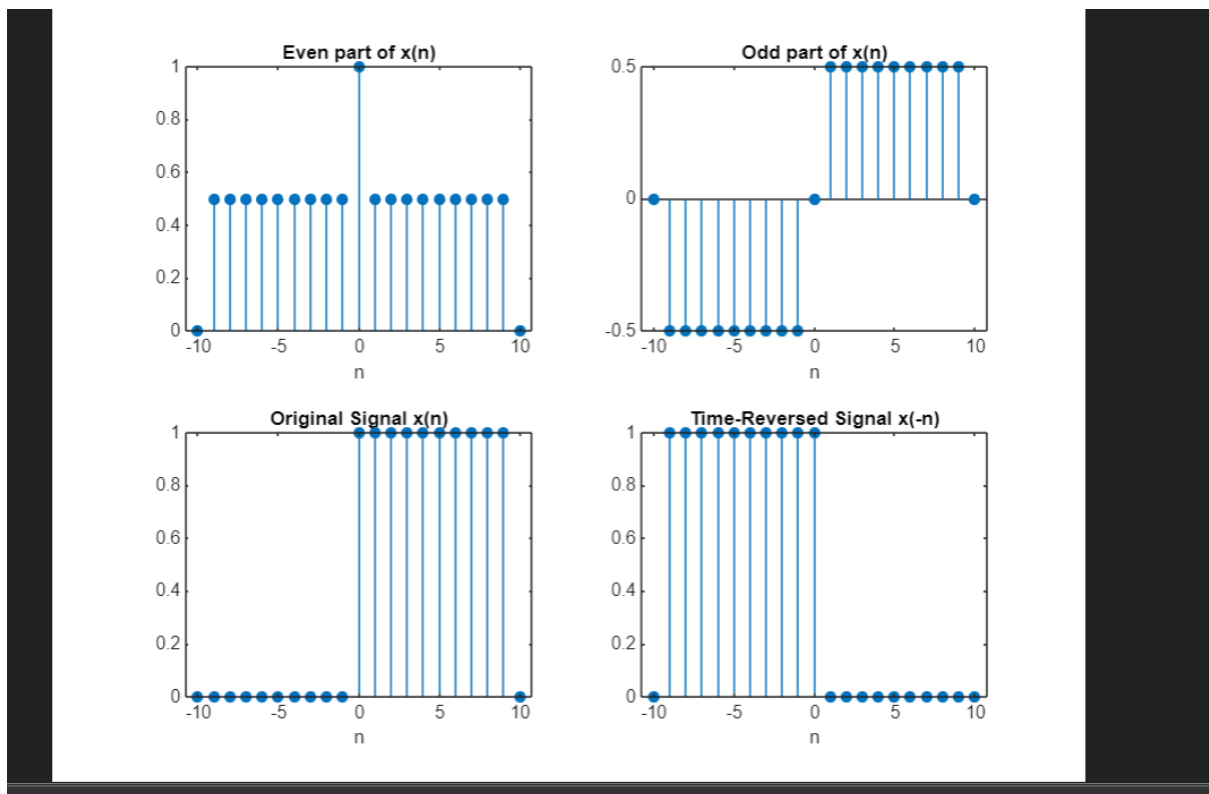
subplot(2, 2, 1);
stem(n_range, even_part, 'filled');
title('Even part of x(n)');
xlabel('n');

subplot(2, 2, 2);
stem(n_range, odd_part, 'filled');
title('Odd part of x(n)');
xlabel('n');

subplot(2, 2, 3);
stem(n_range, signal_x, 'filled');
title('Original Signal x(n)');
xlabel('n');

subplot(2, 2, 4);
stem(n_range, signal_x_reverse, 'filled');
title('Time-Reversed Signal x(-n)');
xlabel('n');
>> |
```

OUTPUT:



CODE:

```
Command window
>> signal_x = [3, 1, 7, 0, -1, 4, 2];
shifted_y = [7, 0, -1, 4, 2];
figure;
len_x = length(signal_x);
len_y = length(shifted_y);
cross_corr = zeros(1, len_x + len_y - 1);
for lag = -(len_y-1):(len_x-1)
    for index_y = 1:len_y
        if (index_y + lag > 0 && index_y + lag <= len_x)
            cross_corr(lag + len_y) = cross_corr(lag + len_y) + shifted_y(index_y) * signal_x(index_y + lag);
        end
    end
end
lag_values = -(len_y-1):(len_x-1);
stem(lag_values, cross_corr, 'filled');
title('Cross-Correlation between shifted y(n) and original x(n)');
xlabel('Lag');
ylabel('Cross-Correlation R_{yx}(m)');
grid on;
```

OUTPUT:

