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% CPE 3103 - FUNDAMENTALS OF MIXED SIGNALS AND SENSORS
% Group 1    MW 10:30 AM - 1:30 PM LBCEAC2 TC
% Sarcol, Joshua S    BS-CpE 3    2025/09/04
% Laboratory Exercise 1.b (Plot the path)

function PlotThePath (signal, args)
    % only accepts the signals listed
    arguments
        signal (1,1) string {mustBeMember(signal, ["step", "sin", "exp"])}
    end

    % values must be real numbers
    arguments (Repeating)
        args (1,1) double {mustBeReal}
    end

    % counts the number of values entered by the user after the signal
    % argument
    n = numel(args);

    x = -5:0.01:5;    % x ranges from -5 to 5
    y = zeros(size(x)); % y is the same size as x

    % fill-out the values of y depending on the signal formula
    switch signal
        % step = u(t)
        % 1 for t >= arg and 0 otherwise
        % expected no. of arguments: 1
        case "step"
            argcount(n, 1)
            y(x >= args{1}) = 1;

            % sinusoidal = A * sin(omega * t + theta)
            % expected no. of arguments: 3
            case "sin"
                argcount(n, 3)
                y = args{1} * sin(args{2} * x * pi + args{3});

            % exponential = A * e^(-b * t)
            % expected no. of arguments: 2
            case "exp"
                argcount(n, 2)
                y = args{1} * exp(-1 * args{2} * x);
    end

    % plot the signal
    plot(x, y);
    grid on
    axis square
    title(signal + " signal")
    xlabel("x-axis")
    ylabel("y-axis")

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end
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% helper function to show an error if the expected number of arguments does  
% not match the user input
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function argcount(n, t)
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    if n ~= t
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        error("Expected number of variables is " + t + ", provided is " ...  
              + n)
```

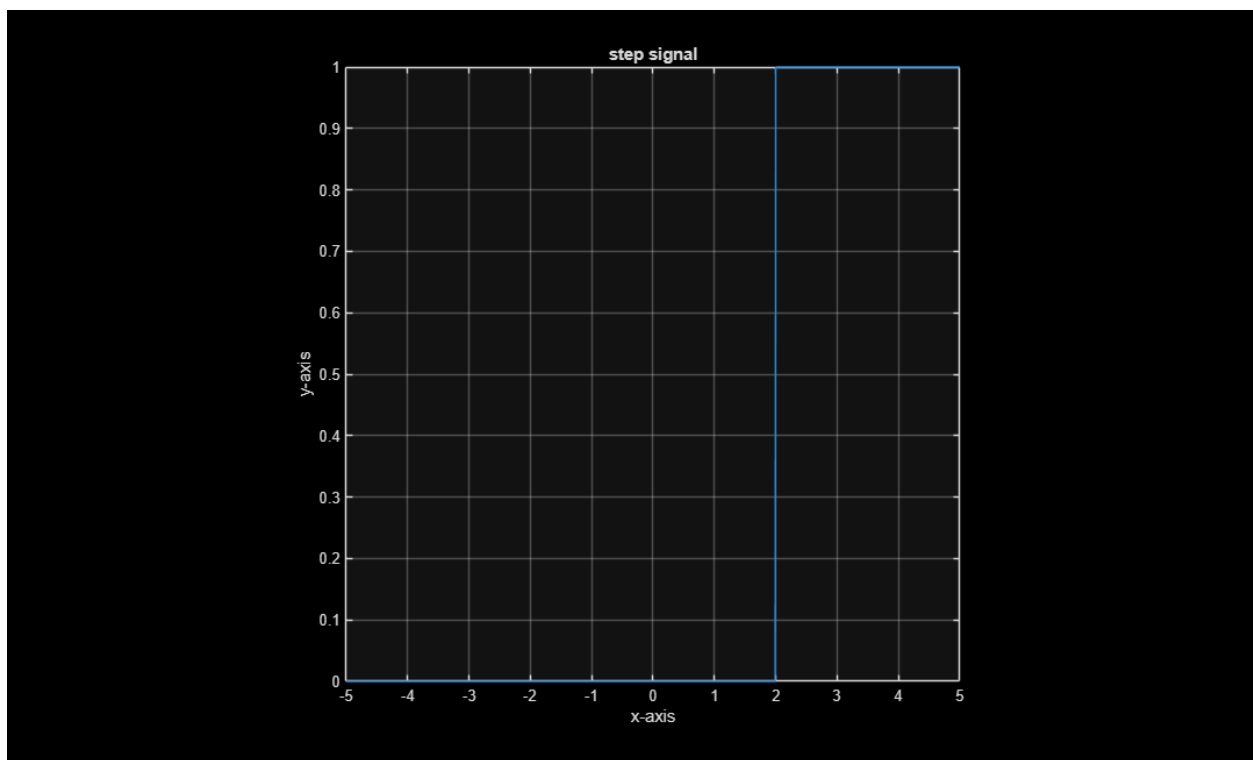
```
    end
```

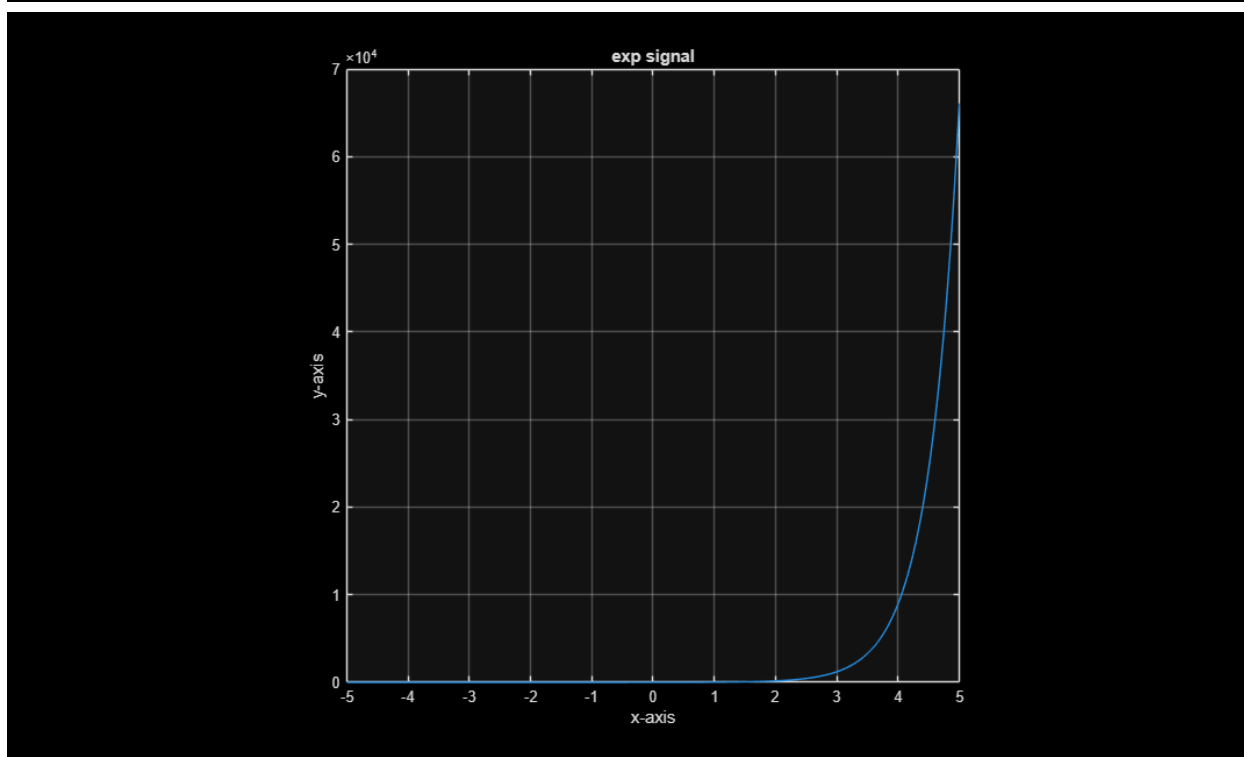
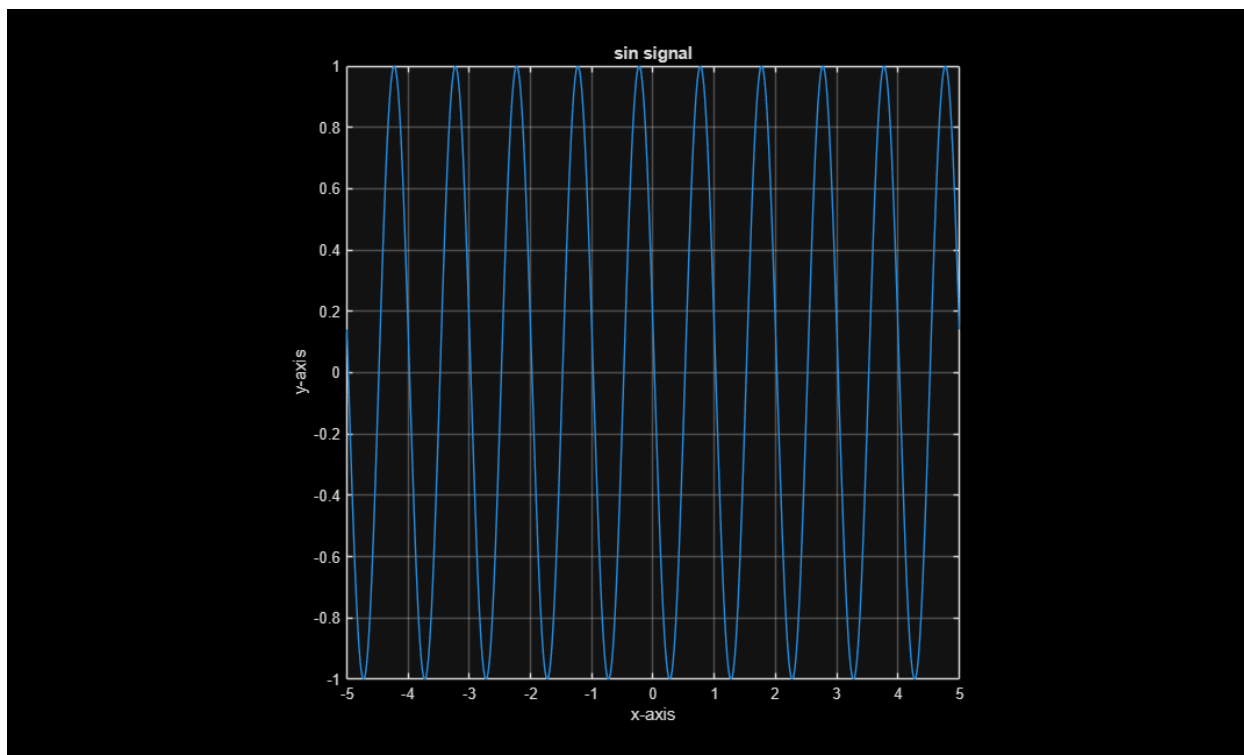
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end
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PlotThePath('step', 2)
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PlotThePath('sin', 1, 2, 3)
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```
PlotThePath('exp', 3, -2)
```





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