Creating 2-D Plots in MATLAB

Visualizing Data & Equations
Using the PLOT command

Creating Basic Plots

- `plot(x,y)` Plots vector x versus vector y
- `plot(x)` Plots vector x

- Multiple lines on one plot
  - The “hold on” command
    - hold on; plot(); plot(); ...
    - hold off;
  - `plot(x_1,y_1,'r+-', x_2,y_2,'k',...)`;
    - ‘options’ for line color, data markers, and line format

- The “grid” command
- The “figure” command
Labeling a Plot

A MUST For ALL Plots

PLabeling Axes
  ▶ xlabel(‘label’); ylabel(‘label’);

PPlot title
  ▶ title(‘title’);

PLegend
  ▶ legend(‘entry 1’, ‘entry 2’, ... )

PAdding Text
  ▶ text(x,y,‘text’)
    – Adds ‘text’ to the position x,y on the plot
Subdividing a Plotting Window

The SUBPLOT Command

\texttt{subplot(m,n,p), plot(x,y,\textquote{line style})}

- Creates a plotting window with \textit{m} rows and \textit{n} columns of plots. The current plot is placed in \textit{p}.
- \textit{p} is counted along rows
Scaling Axes

Customizing Plot Axes

\( \text{Paxis}([X_{\text{min}} \ X_{\text{max}} \ Y_{\text{min}} \ Y_{\text{max}}]) \)

- Manually sets the limits on the x and y axes

\( \text{Paxis manual} \)

- Locks the current axis format so the next line plotted (using ‘hold on’) will not modify the scale.
Example: The Ideal Gas Law

\[ PV = nRT \]
\[ P \bar{V} = RT \]

V is the volume occupied by \( n \) moles of gas at temperature \( T \) and pressure \( P \)

\( \bar{V} \) is the volume occupied by 1 mole of gas at temperature \( T \) and pressure \( P \)

R = 0.08206 L atm/mol K

Plot \( \bar{V} \) as a function of \( T \) at various pressures

What do we expect?

Plot \( \bar{V} \) as a function of \( P \) at various temperatures

What do we expect?