

# Creating 2-D Plots in MATLAB

---

Visualizing Data & Equations



# Using the PLOT command

## Creating Basic Plots

P `plot(x,y)` Plots vector  $x$  versus vector  $y$

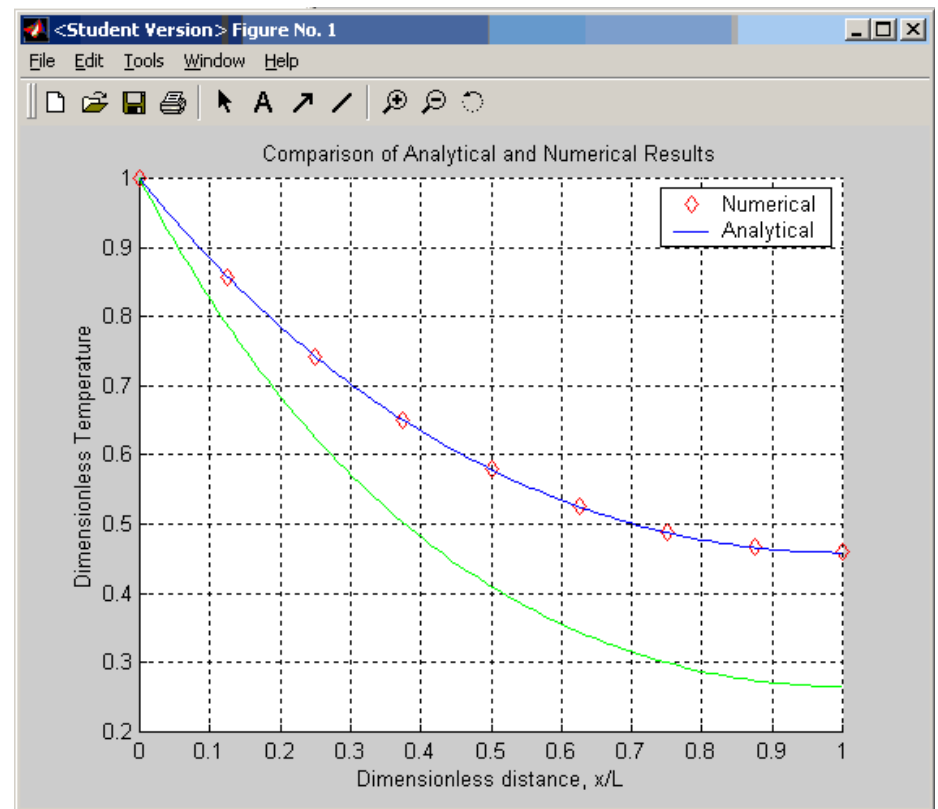
P `plot(x)` Plots vector  $x$

P Multiple lines on one plot

- ▶ The “hold on” command
  - `hold on; plot(); plot(); ...`
  - `hold off;`
- ▶ `plot(x1,y1, 'r+-', x2,y2, 'k',...);`
  - ‘options’ for line color, data markers, and line format

P The “grid” command

P The “figure” command



# Labeling a Plot

---

A MUST For ALL Plots

## P Labeling Axes

- `xlabel('label');` `ylabel('label');`

## P Plot title

- `title('title');`

## P Legend

- `legend('entry 1', 'entry 2', ... )`

## P Adding Text

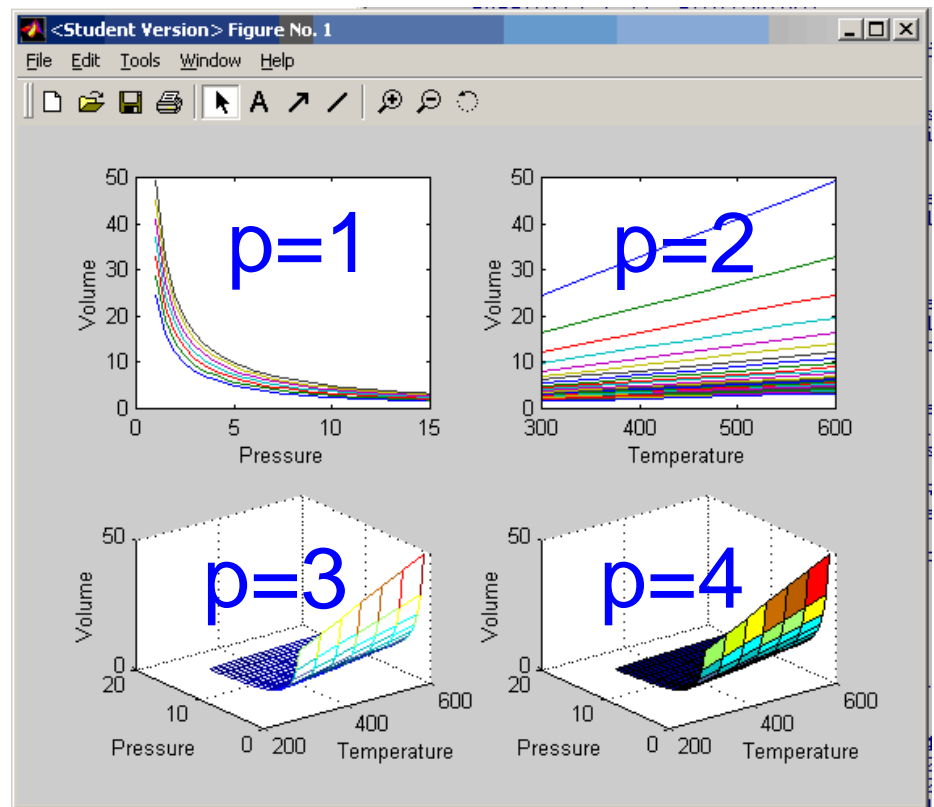
- `text(x,y,'text')`
  - Adds 'text' to the position x,y on the plot



# Subdividing a Plotting Window

## The SUBPLOT Command

- `subplot(m,n,p)`,  
`plot(x,y,'line style')`
- Creates a plotting window with `m` rows and `n` columns of plots. The current plot is placed in `p`.
  - `p` is counted along rows



# Scaling Axes

---

## Customizing Plot Axes

**P**axis( $[X_{\min} \ X_{\max} \ Y_{\min} \ Y_{\max}]$ )

- ▶ Manually sets the limits on the x and y axes

**P**axis manual

- ▶ Locks the current axis format so the next line plotted (using 'hold on') will not modify the scale.



# Example: The Ideal Gas Law

---

$$PV = nRT$$

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

$$P\bar{V} = RT$$

$R = 0.08206 \text{ L atm/mol K}$

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

P Plot  $V_{\text{bar}}$  as a function of T at various pressures

► What do we expect?

P Plot  $V_{\text{bar}}$  as a function of P at various temperatures

► What do we expect?

