Plots in MATLAB

MATLAB plots lists of points. For example, enter the following vectors \( x \) and \( y \), then plot them together.

\[
\begin{align*}
&\quad \text{>> } x = [2 \ 4 \ 6] \\
&\quad \text{>> } y = [7 \ 8 \ 9] \\
&\quad \text{>> plot}(x,y)
\end{align*}
\]

With the `plot` command above, MATLAB will plot the \((x, y)\) pairs: \((2, 7)\), \((4, 8)\), and \((6, 9)\). By default, MATLAB connects the data points with a solid line. Alternately, you can type

\[
\begin{align*}
&\quad \text{>> plot}(x,y,'r') \\
&\quad \text{>> plot}(x,y,'o') \\
&\quad \text{>> plot}(x,y,':')
\end{align*}
\]

to, respectively, draw the line in red; put open circles at each point; or draw the line as dots. You can combine commands as well:

\[
\begin{align*}
&\quad \text{>> plot}(x,y,'ro')
\end{align*}
\]

will draw red open circles at each point. Here’s a table of more options:

<table>
<thead>
<tr>
<th>Color</th>
<th>Symbol</th>
<th>Line</th>
</tr>
</thead>
<tbody>
<tr>
<td>y</td>
<td>.</td>
<td>point</td>
</tr>
<tr>
<td>m</td>
<td>o</td>
<td>circle</td>
</tr>
<tr>
<td>c</td>
<td>x</td>
<td>x-mark</td>
</tr>
<tr>
<td>r</td>
<td>+</td>
<td>plus</td>
</tr>
<tr>
<td>g</td>
<td>*</td>
<td>star</td>
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<tr>
<td>b</td>
<td>s</td>
<td>square</td>
</tr>
<tr>
<td>w</td>
<td>d</td>
<td>diamond</td>
</tr>
<tr>
<td>k</td>
<td>v</td>
<td>triangle (down)</td>
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<tr>
<td></td>
<td>^</td>
<td>triangle (up)</td>
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<td>triangle (left)</td>
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<td>&gt;</td>
<td>triangle (right)</td>
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<tr>
<td>p</td>
<td>p</td>
<td>pentagram</td>
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<tr>
<td>h</td>
<td>h</td>
<td>hexagram</td>
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</tbody>
</table>
If you have two pairs of vectors, say $x_1$, $y_1$, and $x_2$, $y_2$, you can plot the curves represented by both pairs on the same set of axes, using the command

\[
\text{>> plot}(x_1,y_1,x_2,y_2)
\]

You can specify options for each graph as well:

\[
\text{>> plot}(x_1,y_1,’g’,x_2,y_2,’h’)
\]

Now suppose you’d like to graph a function. You need to specify a list of points on the x-axis. One way to do this is to use the \texttt{linspace} command:

\[
\begin{align*}
&\text{>> } x = \text{linspace}(-2,2) \\
&\text{>> } w = \text{linspace}(-2,2,10)
\end{align*}
\]

The array of $x$-values above is evenly spaced between $-2$ and $2$. Similarly, the $w$-values are evenly spaced between $-2$ and $2$, and we have specified that MATLAB should use 10 values. Now we can plot, say, $\sin(x)$:

\[
\text{>> plot}(x,\sin(x),w,\sin(w))
\]