

Figure 4-43. A two-column plot legend

We can use a rounded box (`fancybox`) or add a shadow, change the transparency (alpha value) of the frame, or change the padding around the text (Figure 4-44):

```
In[6]: ax.legend(fancybox=True, framealpha=1, shadow=True, borderpad=1)
fig
```

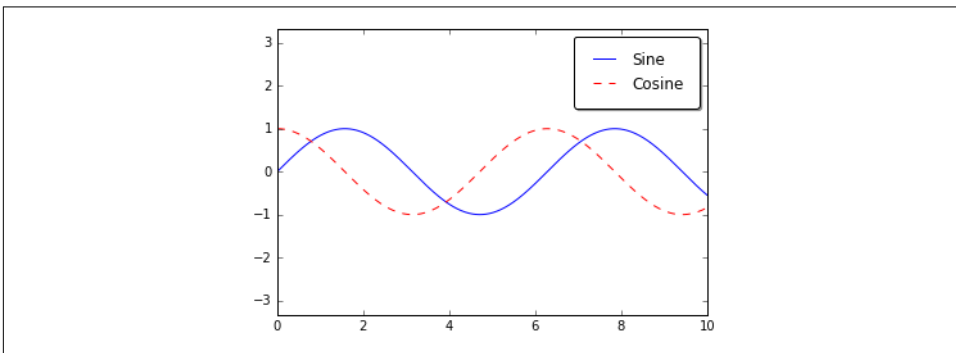


Figure 4-44. A fancybox plot legend

For more information on available legend options, see the `plt.legend` docstring.

Choosing Elements for the Legend

As we've already seen, the legend includes all labeled elements by default. If this is not what is desired, we can fine-tune which elements and labels appear in the legend by using the objects returned by plot commands. The `plt.plot()` command is able to create multiple lines at once, and returns a list of created line instances. Passing any of these to `plt.legend()` will tell it which to identify, along with the labels we'd like to specify (Figure 4-45):

```
In[7]: y = np.sin(x[:, np.newaxis] + np.pi * np.arange(0, 2, 0.5))
lines = plt.plot(x, y)
```

```
# lines is a list of plt.Line2D instances
plt.legend(lines[:2], ['first', 'second']);
```

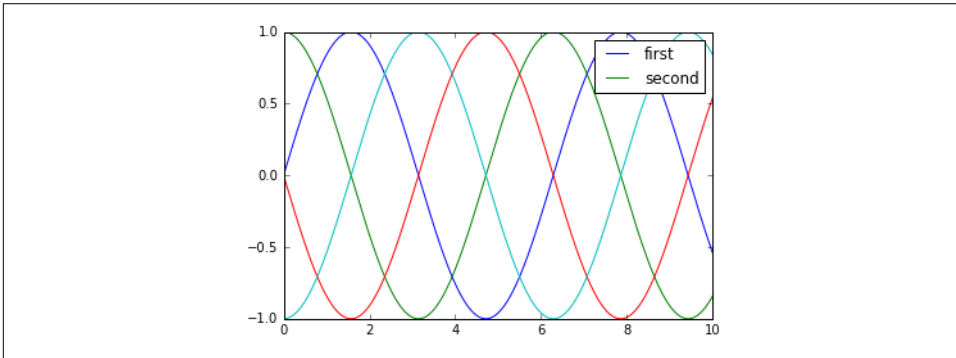


Figure 4-45. Customization of legend elements

I generally find in practice that it is clearer to use the first method, applying labels to the plot elements you'd like to show on the legend (Figure 4-46):

```
In[8]: plt.plot(x, y[:, 0], label='first')
plt.plot(x, y[:, 1], label='second')
plt.plot(x, y[:, 2:])
plt.legend(framealpha=1, frameon=True);
```

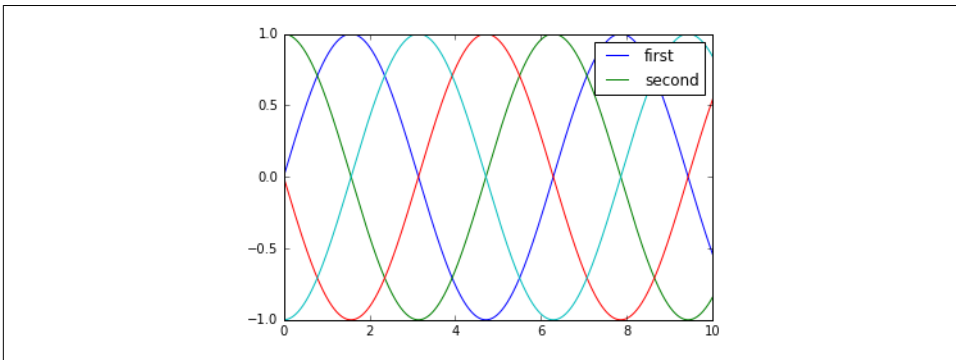


Figure 4-46. Alternative method of customizing legend elements

Notice that by default, the legend ignores all elements without a `label` attribute set.

Legend for Size of Points

Sometimes the legend defaults are not sufficient for the given visualization. For example, perhaps you're using the size of points to mark certain features of the data, and want to create a legend reflecting this. Here is an example where we'll use the size of points to indicate populations of California cities. We'd like a legend that specifies the