1. 线性核软边界：

代码：

**from** sklearn **import** svm  
**import** matplotlib.pyplot **as** plt  
**import** numpy **as** np  
  
*#读取数据集*X=np.array([[-1,-1],[-1,1],[2,2],[1,-1]])  
Y=np.array([-1,1,-1,1])  
  
*#画出散点*plt.scatter(X[::2, 0], X[::2, 1],c=**'r'**)  
plt.scatter(X[1::2, 0], X[1::2, 1],c=**'b'**)  
  
*#线性核函数分类*clf = svm.SVC(C=0.1,kernel=**'linear'**)  
clf.fit(X, Y)  
  
*#求得并画出超平面*w = clf.coef\_[0]  
a = -w[0]/w[1]  
xx = np.linspace(-2.5, 2.5)  
yy = a \* xx - (clf.intercept\_[0]) / w[1]  
b = clf.support\_vectors\_[1]  
yy\_down = a \* xx + (b[1] - a \* b[0])  
b = clf.support\_vectors\_[-1]  
yy\_up = a \* xx + (b[1] - a \* b[0])  
plt.plot(xx, yy, **'k-'**)  
plt.plot(xx, yy\_down, **'k--'**)  
plt.plot(xx, yy\_up, **'k--'**)  
  
*#调节坐标轴*ax = plt.gca()  
ax.xaxis.set\_ticks\_position(**'bottom'**)  
ax.spines[**'bottom'**].set\_position((**'data'**,0))  
ax.yaxis.set\_ticks\_position(**'left'**)  
ax.spines[**'left'**].set\_position((**'data'**,0))  
ax.spines[**'top'**].set\_color(**'none'**)  
ax.spines[**'right'**].set\_color(**'none'**)  
plt.xlim(-2.5,2.5)  
plt.ylim(-2.5,2.5)  
plt.grid()  
plt.gca().set\_aspect(1)  
  
plt.show()

