**第九章练习题**

**1、源代码：**

from numpy.linalg import inv

import numpy as np

a = np.array([[1,0.5,5],[2.3,2,3],[4,1,1.7]])

b = np.array([[1,2,3]])

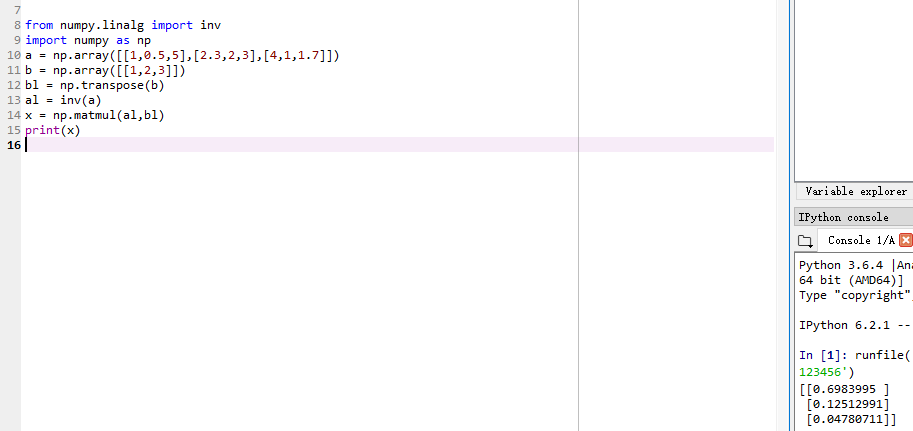
bl = np.transpose(b)

al = inv(a)

x = np.matmul(al,bl)

print(x)

执行源代码的结果：



1. **源代码：**

from PIL import Image

import numpy as np

vec\_el = np.pi/2.2

vec\_az = np.pi/4.

depth = 80.

**i**m = Image.open('自己.jpg').convert('L')

a = np.asarray(im).astype('float')

grad = np.gradient(a)

grad\_x, grad\_y = grad

grad\_x = grad\_x\*depth/100.

grad\_y = grad\_y\*depth/100.

dx = np.cos(vec\_el)\*np.cos(vec\_az)

dy = np.cos(vec\_el)\*np.sin(vec\_az)

dz = np.sin(vec\_el)

A = np.sqrt(grad\_x\*\*2 + grad\_y\*\*2 + 1.)

uni\_x = grad\_x/A

uni\_y = grad\_y/A

uni\_z = 1./A

a2 = 255\*(dx\*uni\_x + dy\*uni\_y + dz\*uni\_z)

a2 = a2.clip(0,255)

im2 = Image.fromarray(a2.astype('uint8'))

im2.save('自己HandDraw.jpg')

执行源代码的结果：

