**数据结构实验报告13**

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**实验名称**： 第九章程序练习题

**实验要求：**

**实验题目一：1.解方程Ax = b**

1. **人物手绘图绘制**
2. **方波绘制**
3. **Matplotlib官网学习**

**算法实现：**

1. **方法一**

**import numpy as np**

**from numpy.linalg import inv**

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

**###print(x)**

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

**x= np.matmul(inv(A),np.transpose(b))**

**print(x)**

**2.from PIL import Image**

**import numpy as np**

**vec\_el = np.pi/2.2**

**vec\_az = np.pi/4**

**depth = 20.**

**im = Image.open('D:\\study materials\\picture\\yin.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('D:\\study materials\\picture\\yin3.jpg')**

**3.import matplotlib.pyplot as plt**

**import numpy as np**

**x = np.linspace(-1,1,800)**

**y = np.linspace(-1,1,800)**

**px = []**

**py = []**

**for xx in x:**

**for yy in y:**

**if np.abs(xx\*\*2 +yy\*\*2 -1)<= 1e-3:**

**px.append(xx)**

**py.append(yy)**

**plt.scatter(px,py)**

**plt.axis('equal')**

**plt.show()**

**实验结果：**



