

# 作业1

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2019 年 11 月 13 日

## 摘要

This article shows some example in using  $\text{\LaTeX}$ . We recommend all of you write the homework using  $\text{\LaTeX}$ .

## 1 绘制 $[0, 2\pi]$ 上 $y_1=\sin x, y_2=\cos x, y_3=x^2$ 曲线在同一张图片中

所用语言: python3

所用库: PIL, numpy

思路: 初始化X数组, 分别计算出Y1、Y2、Y3, 新建指定大小的二维数组后按比例插值, 最后将二维数组转为图片输出。

代码:

```
1 from PIL import Image
2 import numpy as np
3
4
5 def generateFigure(shape=(256, 256), thickness=1):
6     step = 2 * np.pi / shape[0]
7     X = np.arange(0, 2 * np.pi + step, step)
8     Y1, Y2, Y3 = np.sin(X), np.cos(X), X ** 2
9     MAX = shape[1] // 2
10    img = np.zeros((shape[1], shape[0], 3), dtype=np.
        uint8)
11    for i in range(shape[0]):
```

```

12         for t in range(-thickness // 2, thickness //
13             2, 1):
14             y1, y2, y3 = int(Y1[i] / step) + t, int(Y2
15                 [i] / step) + t, int(Y3[i] / step) + t
16             if np.abs(y1) < MAX:
17                 img[-y1 + MAX, i, 0] = 255 - np.abs(t)
18                 / thickness * 256
19             if np.abs(y2) < MAX:
20                 img[-y2 + MAX, i, 1] = 255 - np.abs(t)
21                 / thickness * 256
22             if np.abs(y3) < MAX:
23                 img[-y3 + MAX, i, 2] = 255 - np.abs(t)
24                 / thickness * 256
25     img = Image.fromarray(img)
26     img.show()
27     img.save(r"./result/homework1-1.jpg")
28
29 if __name__ == "__main__":
30     generateFigure(shape=(4096, 2048), thickness=41)

```

结果:

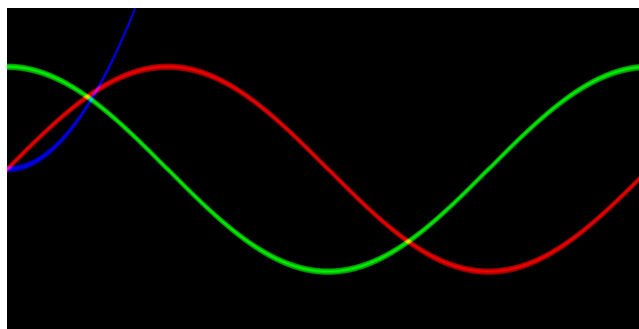


图 1: result

## 2 不使用for的双线性插值

能力有限，只能实现普通的双线性插值，详情见博客

<https://github.com/3017218062/Image-Super-Resolution>