# 背景介绍

朱利亚集合（又译为茹利亚集合，英语： Julia set）是一个在复平面上形成分形的点的集合. 以法国数学家加斯顿 · 朱利亚（Gaston Julia）的名字命名.

# 数学理论

- 朱利亚集合可以由下式进行反复迭代得到：$f_c(z) = z^2 + c$. 对于固定的复数 c, 取某一 z 值（如 $z = z_0$），可以得到序列 $z_0, f_c(z_0), f_c(f_c(z_0)), \ldots$ 这一序列可能反散于无穷大或始终处于某一范围之内并收敛于某一值. 我们将使其不扩散的 z 值的集合称为朱利亚集合.

# 算法

double cx,cy

int k=0

For each pixel p of the image:

Let z be the complex number represented by p

Let z be a complex variable

Set z to 0

Do the following times:

If |z|>K(给定的常数) then color the pixel white, ned this loop

prematurely, go to the next pixel

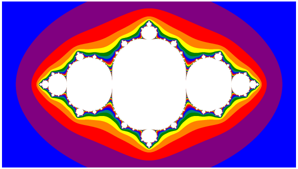
Otherwise replace z by z*z+c,k++

If the loop above reached its natural end: color the pixel p in black

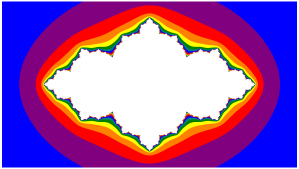
Go to the next pixel

# 数值算例

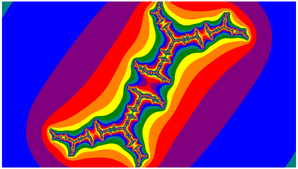
运行结果如下



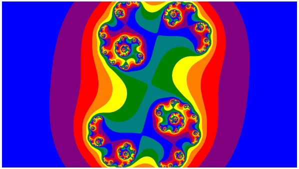
c=(-0.75,0)



c=(-0.618,0)

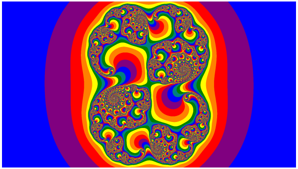


c=(-0.1,-1.0)

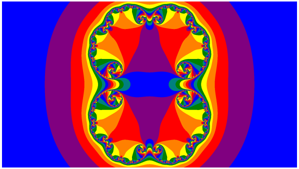


c=(0.45,-0.1428)

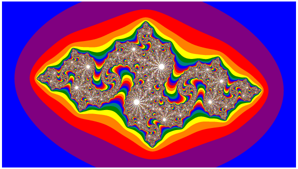
# 数值算例



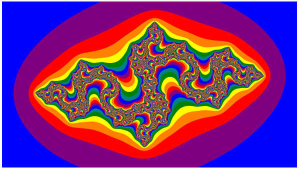
c=(0.285,0.01)



c=(0.285,0)

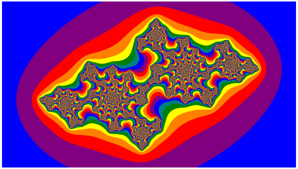


c=(-0.8,0.156)

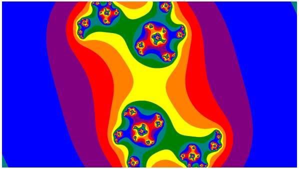


c=(-0.835,-0.2321)

# 数值算例



c=(-0.70176,-0.3842)



c=(0.5,0.5)

# 结论

可以看出，当 c 取值不同时,Julia set 呈现出了截然不同的情况
同时，我们发现，当 c 取（-0.75,0）时，所得到的 Julia Set 就是之前的 MandelbrotSet 分形