Mandelbrot Set

Set of complex numbers, $c \in \mathbb{C}$, :

$$z = z^2 + c$$

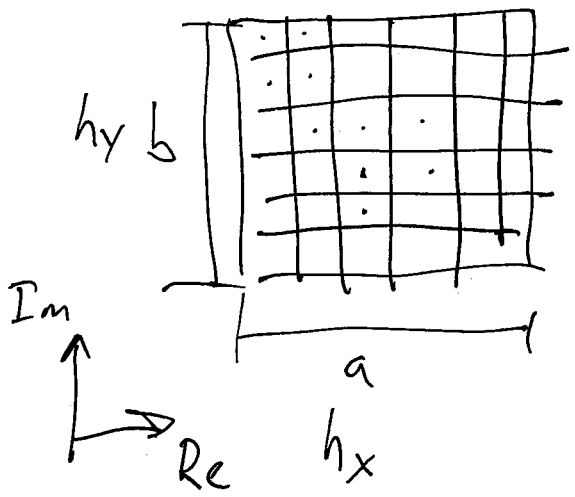
does not diverge

↳ $|z| > 2$

Call this divergence

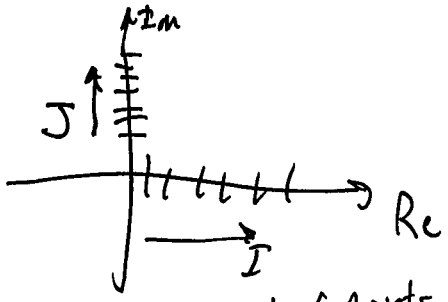
Goal: Estimate the area of the Mandelbrot set

Use Monte Carlo integration



$$\sum_{i \in M_S}^{M} h_x h_y$$

$i(I, J)$



N_I ← # of points in I direction

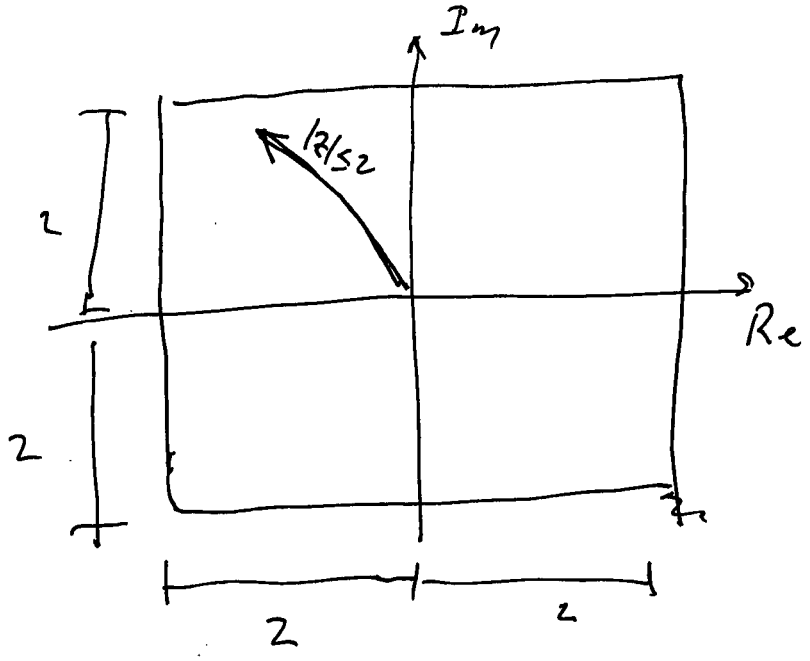
$i = I + (J)\,N_I$, h_x spacing between points

$X_I = h_x \left(I - \frac{N_I - 1}{2}\right)$

$I, J = \text{inv-map}(i)$

$\frac{i}{N_I} \rightarrow J$ $\quad \frac{I}{N_I} + \frac{J\,N_I}{N_I}$

0



Pick $C \rightarrow z_0$

$z_{i+1} = z_i^2 + z_i$

Parallel section (over all C_i's)

for i, pick C_i

for $j = 0, N_{max}$ ← max # of iterations

$z_{j+1} = z_j^2 + z_j$ $\quad (z_{j+1} = z_j^2 + C)$

check $|z| > 2$

if $j == N_{max}$

→ $i \in M/s$ ← reduction variable

Goldbach Conjecture

- Every even number > 2 can be written as the sum of two primes

- Goal: Verify

- How to verify
  - ↳ need prime number
    - ↳ How to get primes?

Given m.

~~Check all $n < \sqrt{m}$~~

Check all $n < \sqrt{m}$

$m \bmod n$

if $\frac{m}{n} > 0$

↳ ~~is~~ m is prime

} verify prime

- Given Even number N

for $i = 3 .. N/2$

Check if i is prime

Check if $(N - i)$ is prime