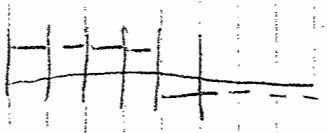
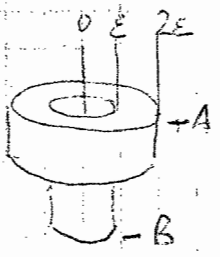
① We need many bits :



② Sub-sampling when high-frequency content → multiple scale edge detection

③ Wiener optimal filtering

④ Image models



An example of Laplacian (rot. symm.)

What are the constraints on A & B ?

① Applied to $f(x,y) = x^2 + y^2$ should give 0 : $-B + 15A = \frac{8}{\pi\varepsilon^4}$

② Applied to constant should give 0 ; $-B + 3A = 0$

↳ $A = \frac{2}{3\pi\varepsilon^4}$ $B = \frac{2}{\pi\varepsilon^4}$

It has a zero response to any linear function.

Laplacian operators :

$\frac{1}{\varepsilon^2}$

	1	
-1	4	1
	1	

(x, y)

$\frac{-1}{2\varepsilon^2}$

1		1
	-4	
1		1

(x', y')

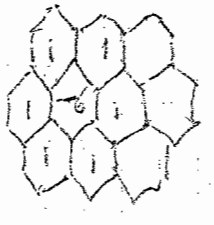
where $(x', y') = (x, y) + 45°$

↳ $\frac{1}{6}(4A + 2B)$

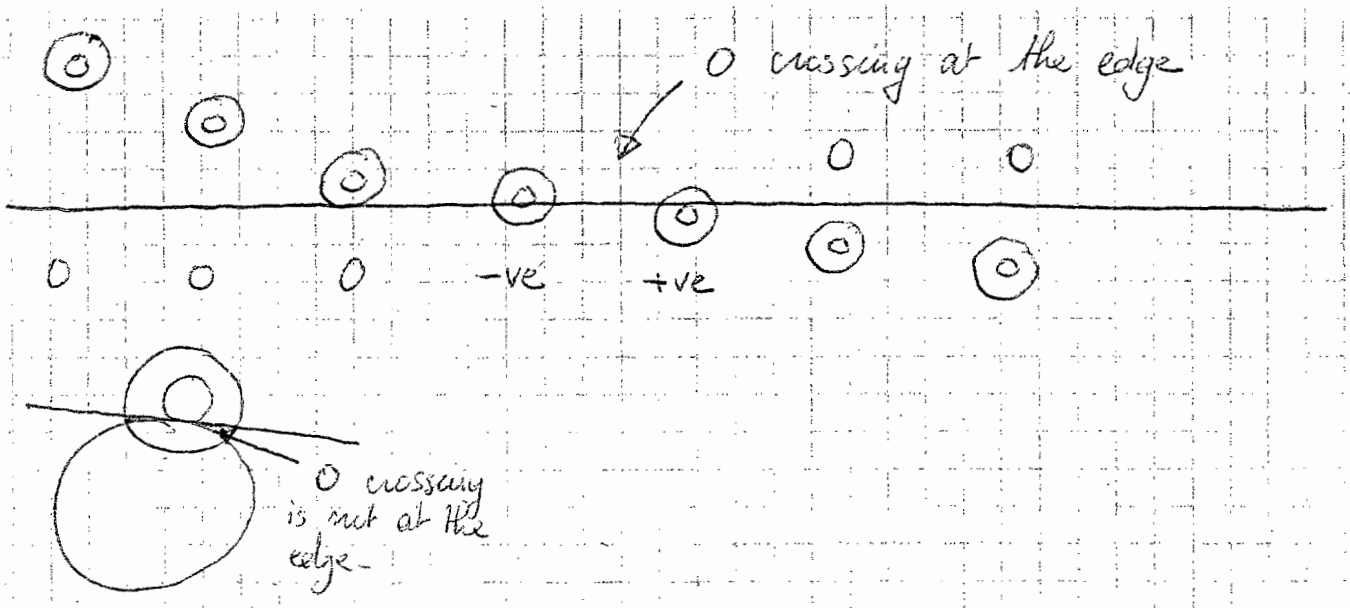
$\frac{1}{6\varepsilon^2}$

1	4	1
4	-20	4
1	4	1

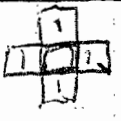
or $\frac{2}{3\varepsilon^2}$



is better.



Topological properties (CH 4.)

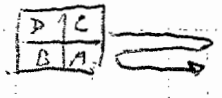
4-connectivity 

Connectivity $b(x,y)=1$ along path

8-connectivity

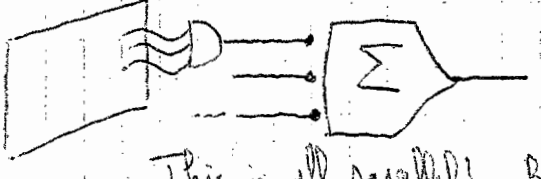
These 2 connectivities are bad. (don't respect Jordan's curve theorem)

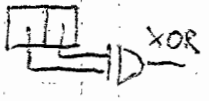
Fix #1: use one for the foreground and one for the background.

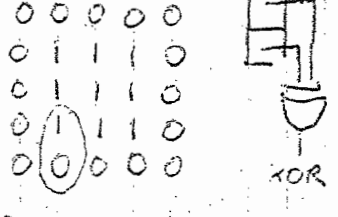
- Grass Fire Analogy
- Sequential Algorithm 

Size table? How large are numbers?
- Local Counting

ex Perimeter







This is all parallel! But it overestimates the perimeter.