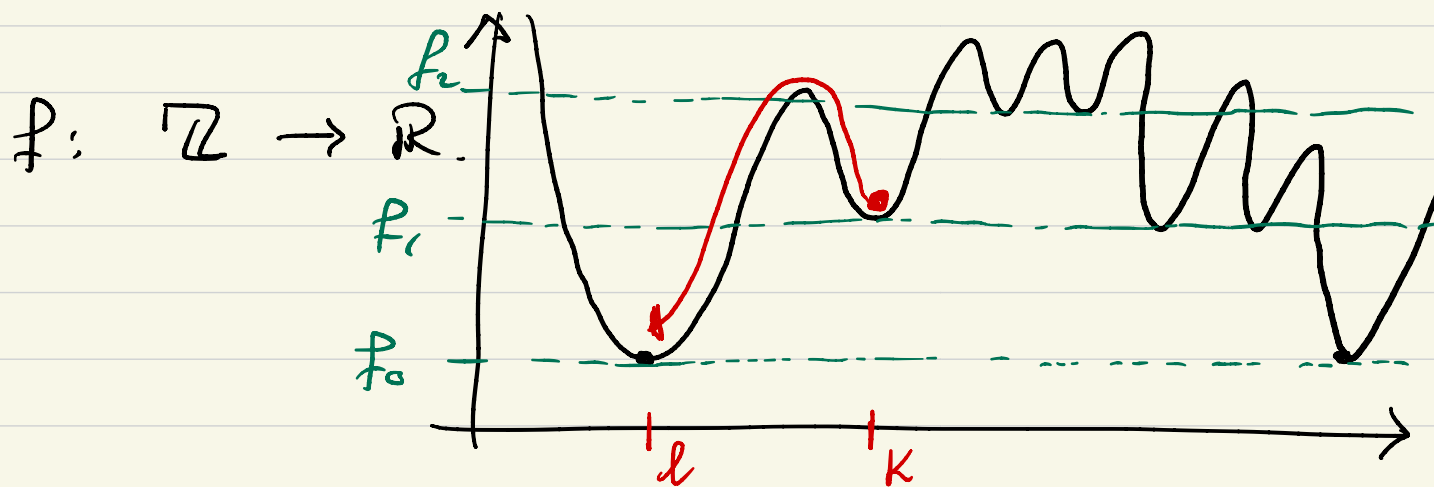


Lecture 9 Quiz and Discussion.

Function Minimisation:



level sets f_0, f_1, f_2, \dots

Degeneracy of each level set N_0, N_1, N_2, \dots

Recall Metropolis Alg
to sample from

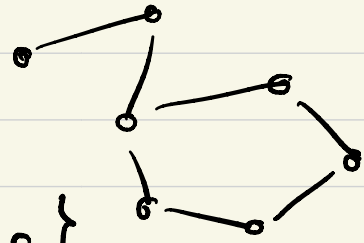
$$\pi(i) = \frac{e^{-\beta f(i)}}{Z}$$

- start at i
 - propose $i \rightarrow i \pm 1$ with prob $\frac{1}{2}$
 - accept with prob
- $$a_{i \rightarrow i \pm 1} = \min\left(1, \frac{\pi(i \pm 1)}{\pi(i)}\right)$$

- 1) Probability of quickest path from k to l ?
- 2) Give a ballpark estimate for choosing β appropriately to sample from the N_0 global minima ?

Coloring: $G = (V, E)$

colors $c \in \{1, 2, \dots, q\}$



Def: Proper coloring is one such that no two adjacent vertices have the same color.

Consider the following proposal chain (MCMC chain)

- Start with initial proper coloring.
- Select vertex v unif at random from V .
- Select color c unif at random from $\{1, 2, \dots, q\}$.

"general"

1) Under what condition on G and q does an initial proper coloring exist?

2) Assuming the condition found in (1) is this proposal chain necessarily irreducible?

3) What condition would make it irreducible?