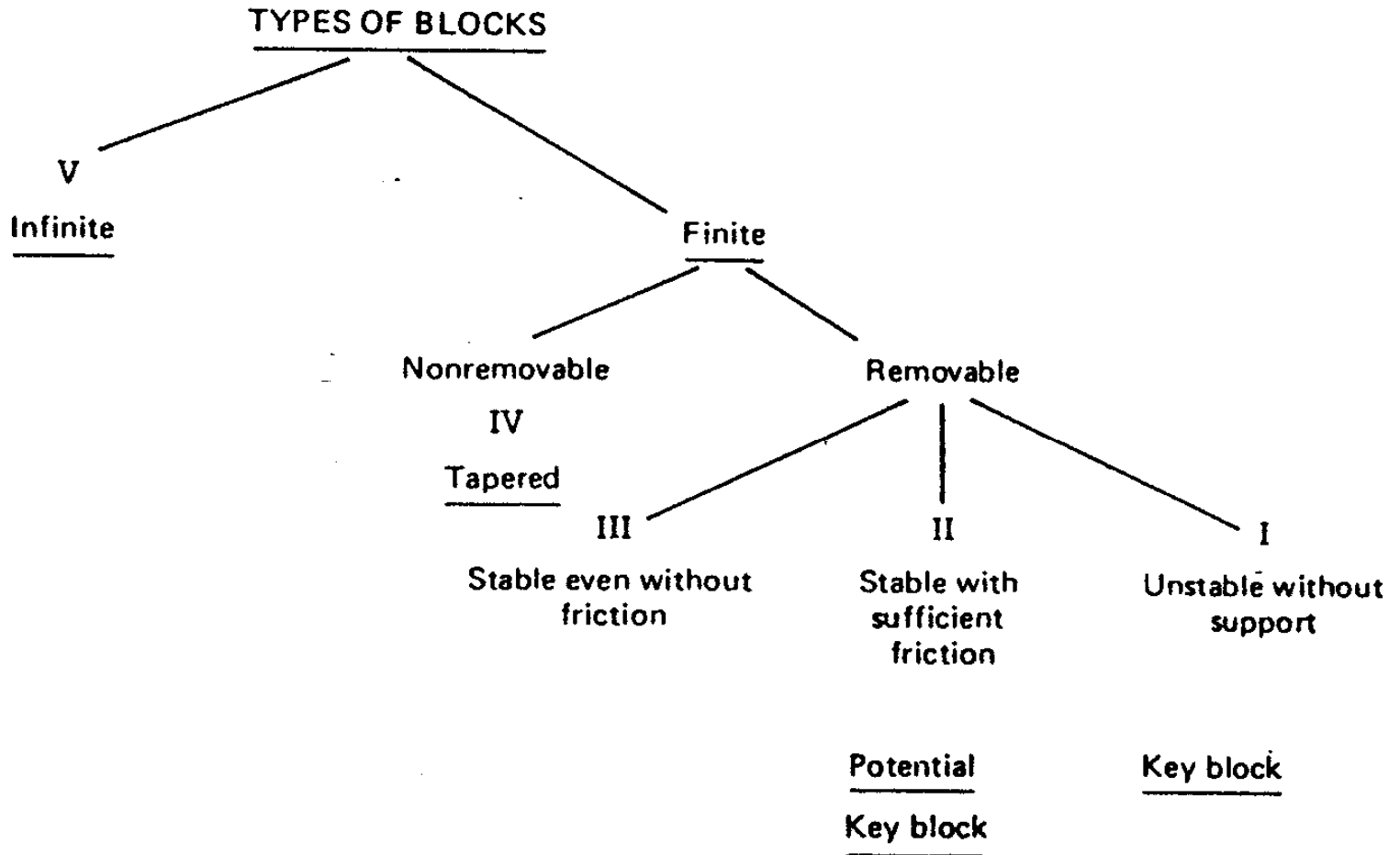
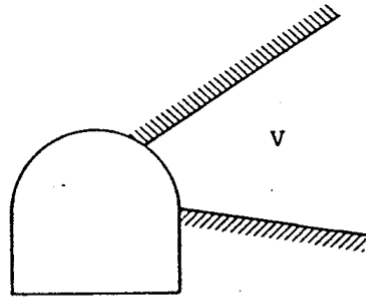


4. The removability of blocks

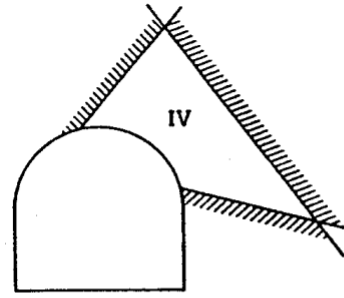
1) Types of blocks



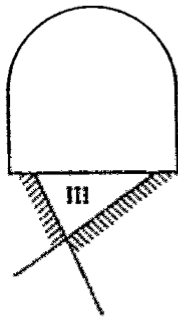
1) Types of blocks



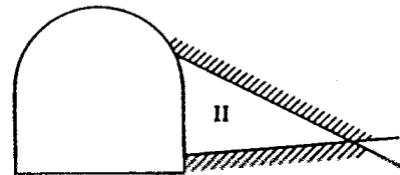
(a)



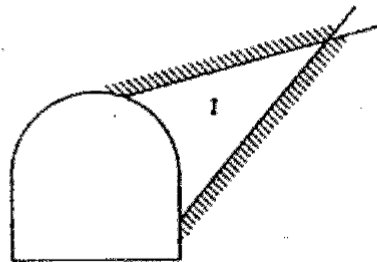
(b)



(c)

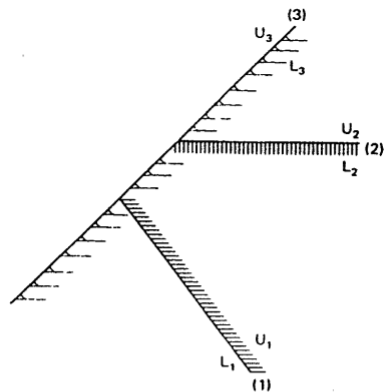


(d)

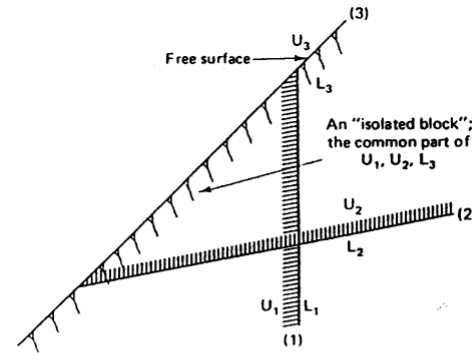


2) Theorem of finiteness

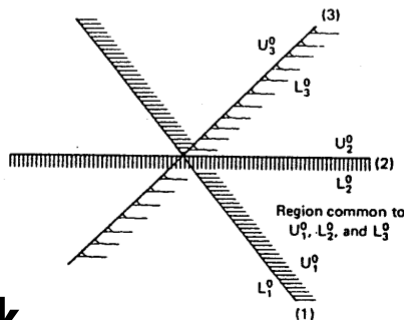
A convex block is finite if its block pyramid is empty. Conversely, a convex block is infinite if its block pyramid is not empty.



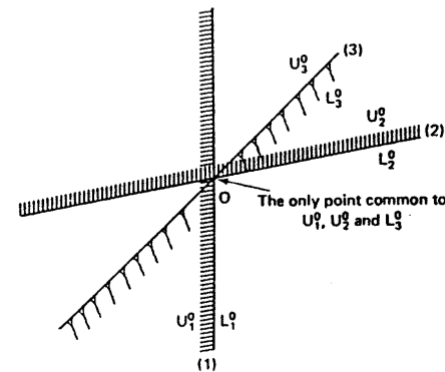
(a)



(a)



(b)



(b)

Infinite block

Finite block

2) Theorem of finiteness

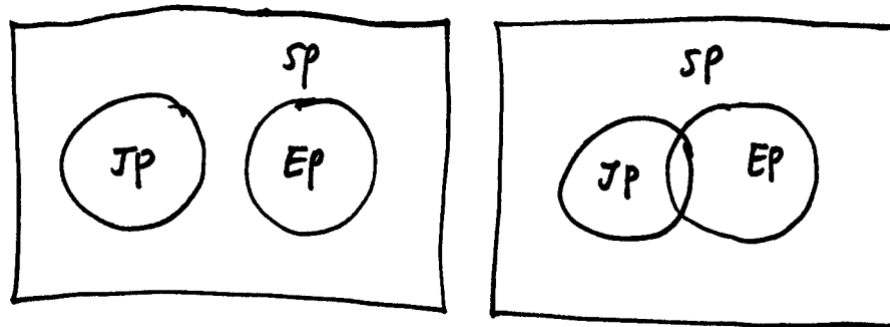
$$BP = JP \cap EP$$

Finiteness theorem \rightarrow Finite block has BP of \emptyset

$$JP \cap EP = \emptyset$$

$$\sim EP = SP$$

$$\therefore JP \subset SP$$



2) Theorem of finiteness

- Finiteness theorem applied to the stereographic projection

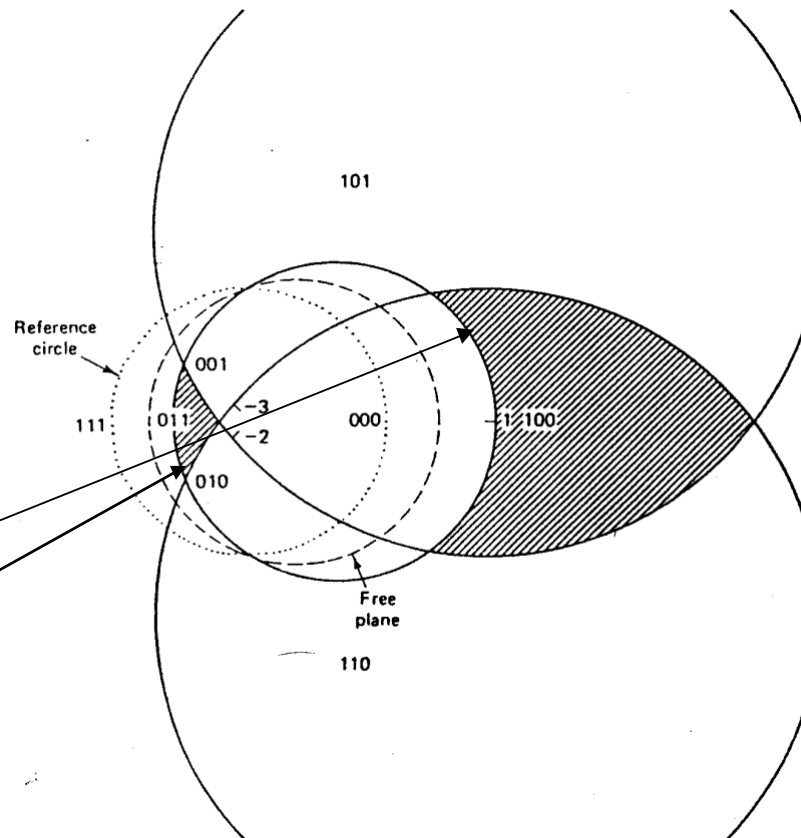
Dip/Dip direction

1. 30/090
2. 65/050
3. 65/130
4. 15/090 (free plane)

Free plane

1) Roof

2) Floor



2) Theorem of finiteness

- Mathematical proofs

1) Half space is convex.

2) BP of a finite block is empty.

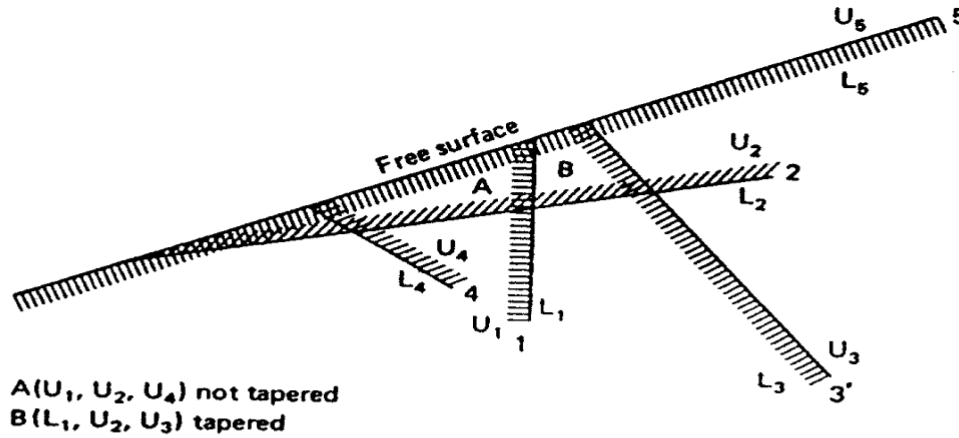
3) If BP is empty the block is finite.

3) Theorem of removability of a finite convex block

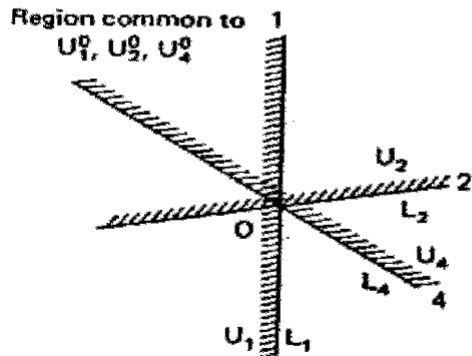
A convex block is removable if its block pyramid is empty and its joint pyramid is not empty.

A convex block is not removable (tapered) if its block pyramid is empty and its joint pyramid is also empty.

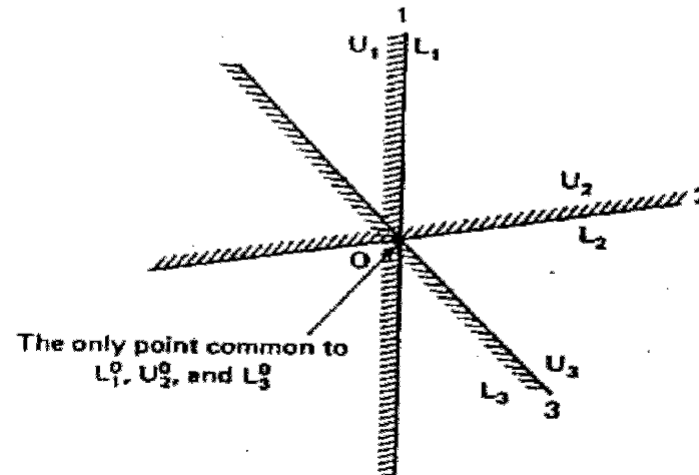
3) Theorem of removability of a finite convex block



(a)



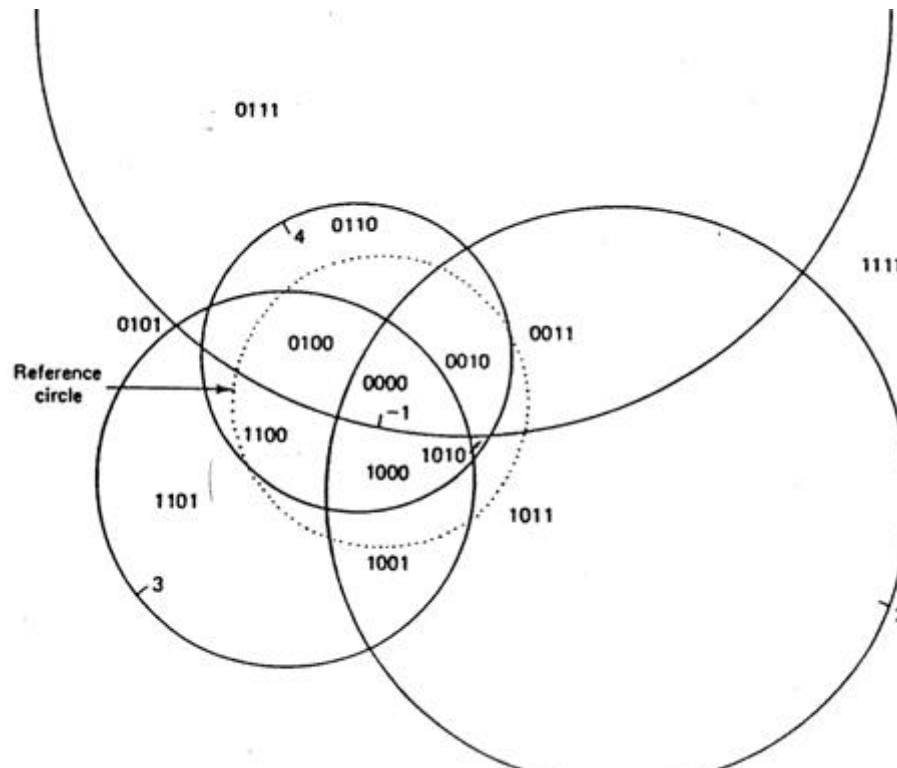
(b)



(c)

3) Theorem of removability of a finite convex block

- Removability theorem applied to the stereographic projection
 - No. of tapered blocks with 3 or 4 joint sets
 - Removable blocks with 4 joint sets



3) Theorem of removability of a finite convex block

- Mathematical meaning of removability theorem
 - \hat{x}_0 satisfying $\hat{n}_i \cdot \hat{x}_0 \geq 0$ exists when \hat{n}_i is an inward-pointing joint normal.

4) Shi's theorem for the removability of non-convex blocks

- United blocks: union of convex blocks
- Necessary condition of removability of a united block
- Removable direction belongs to JP