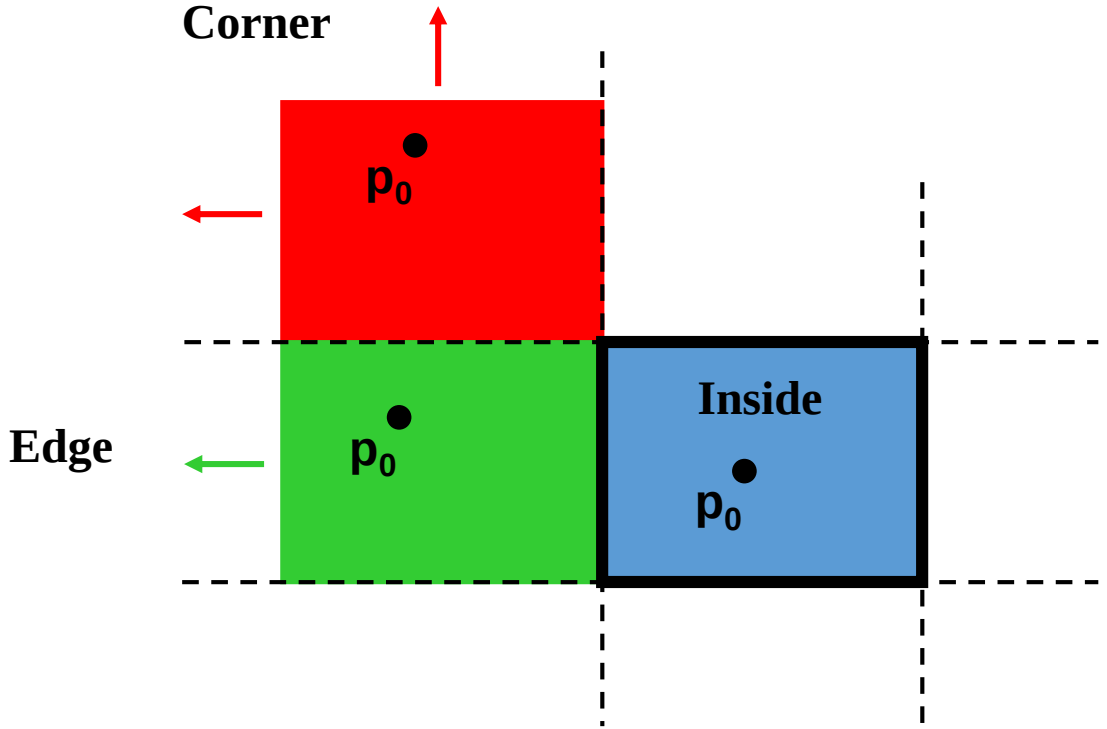
Nicholl-Lee-Nicholl Line Clipping

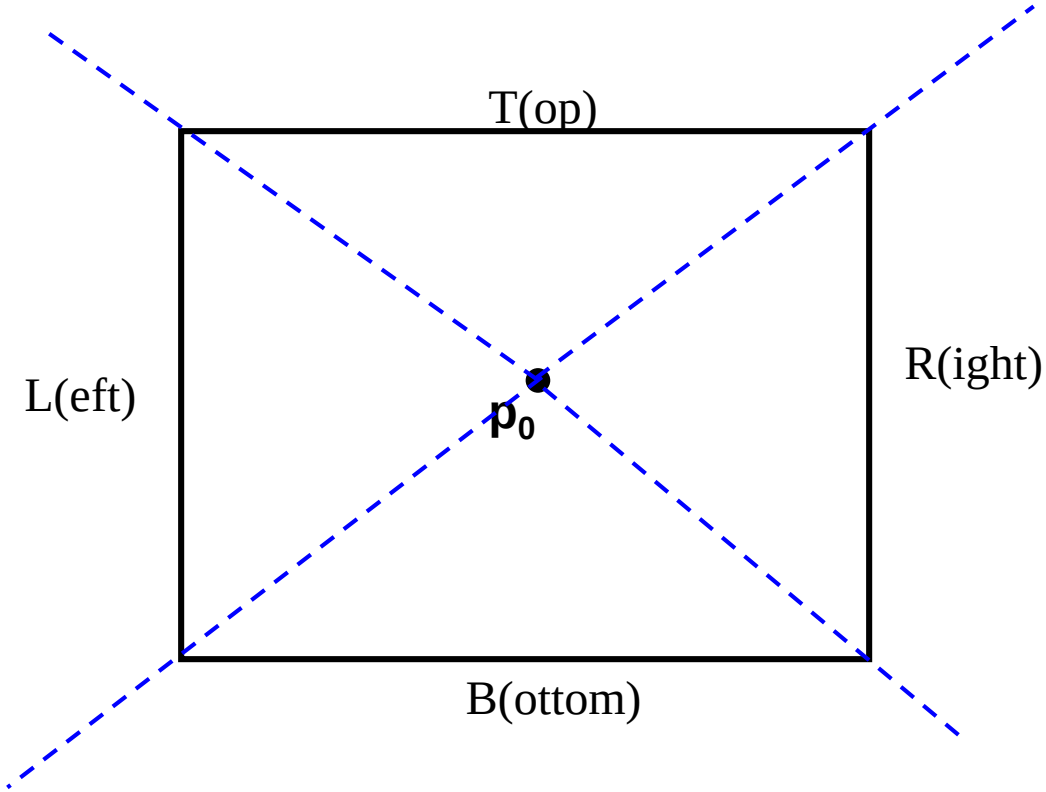
- generate region codes (Cohen-Suther.) & use trivial accept and reject
- when trivial case fails further subdivide regions:
  - consider $\mathbf{p_0}$ in 1 of 3 regions (other cases can be handled from symmetry)



Nicholl-Lee-Nicholl: p_1 subcases

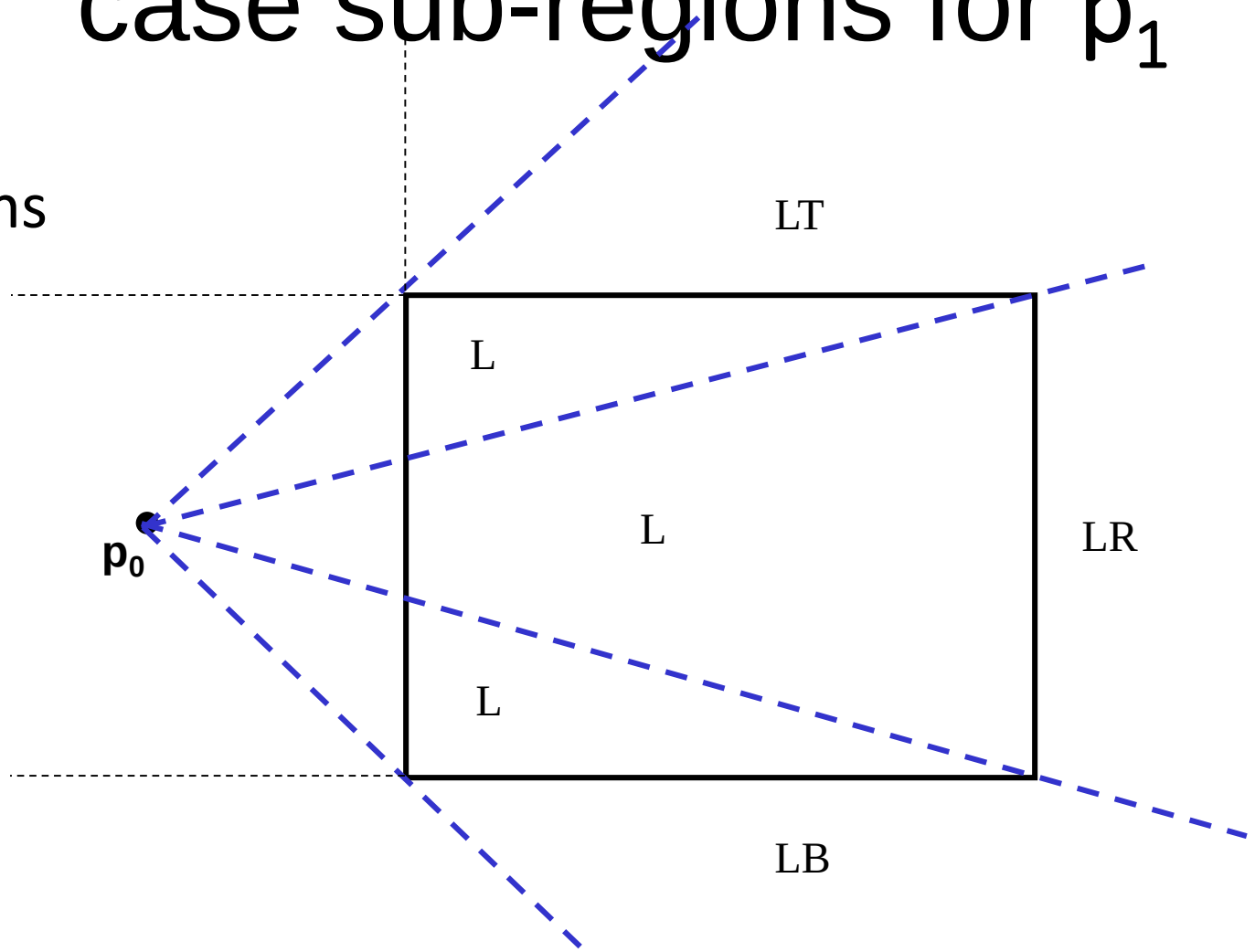
- for each possible region (inside,corner,edge) for p_0 further subdivide space into semi-infinite triangles based on possible locations for p_1

Inside Case for p_0



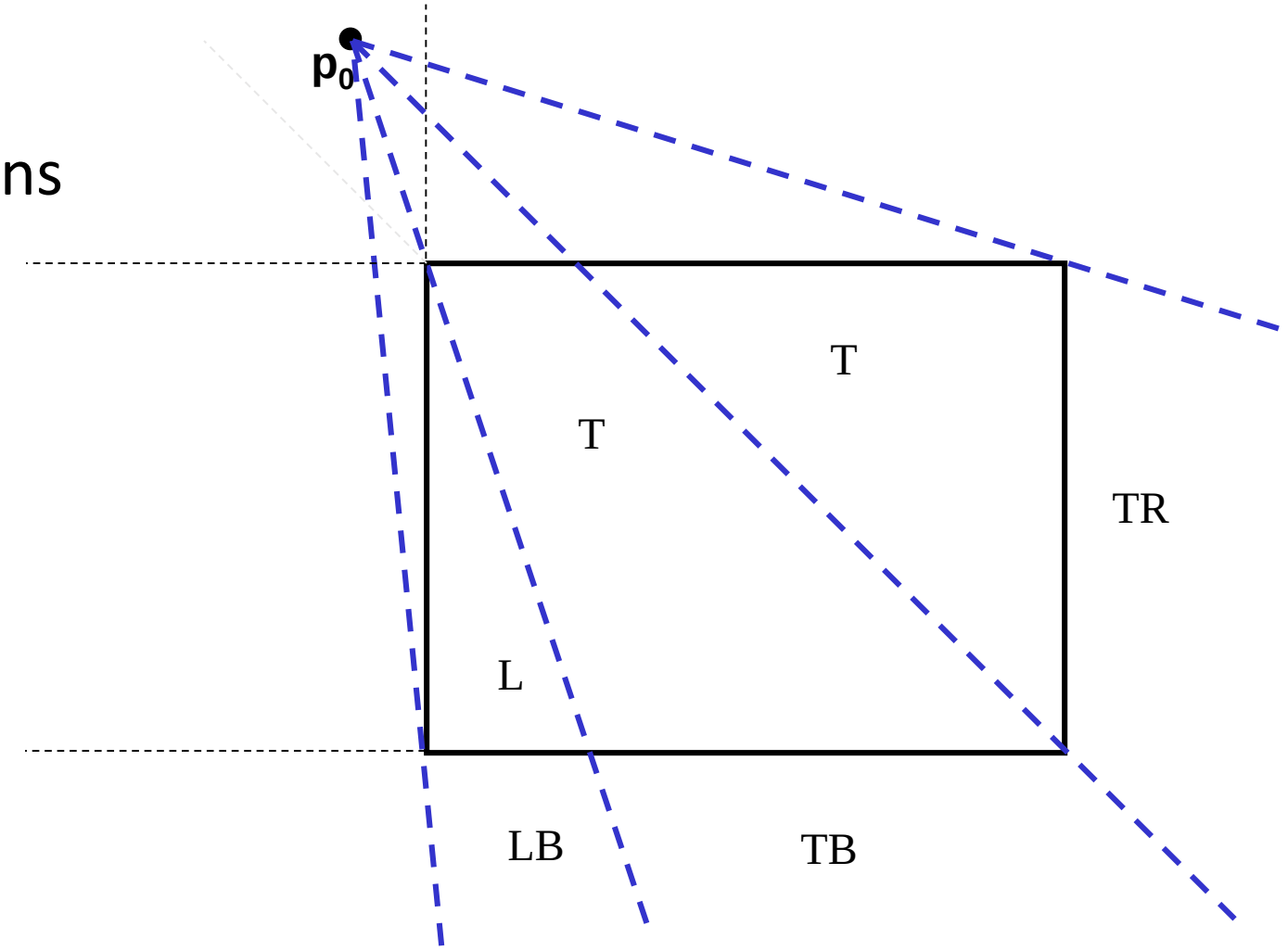
“Edge” case sub-regions for p_1

- 4 regions



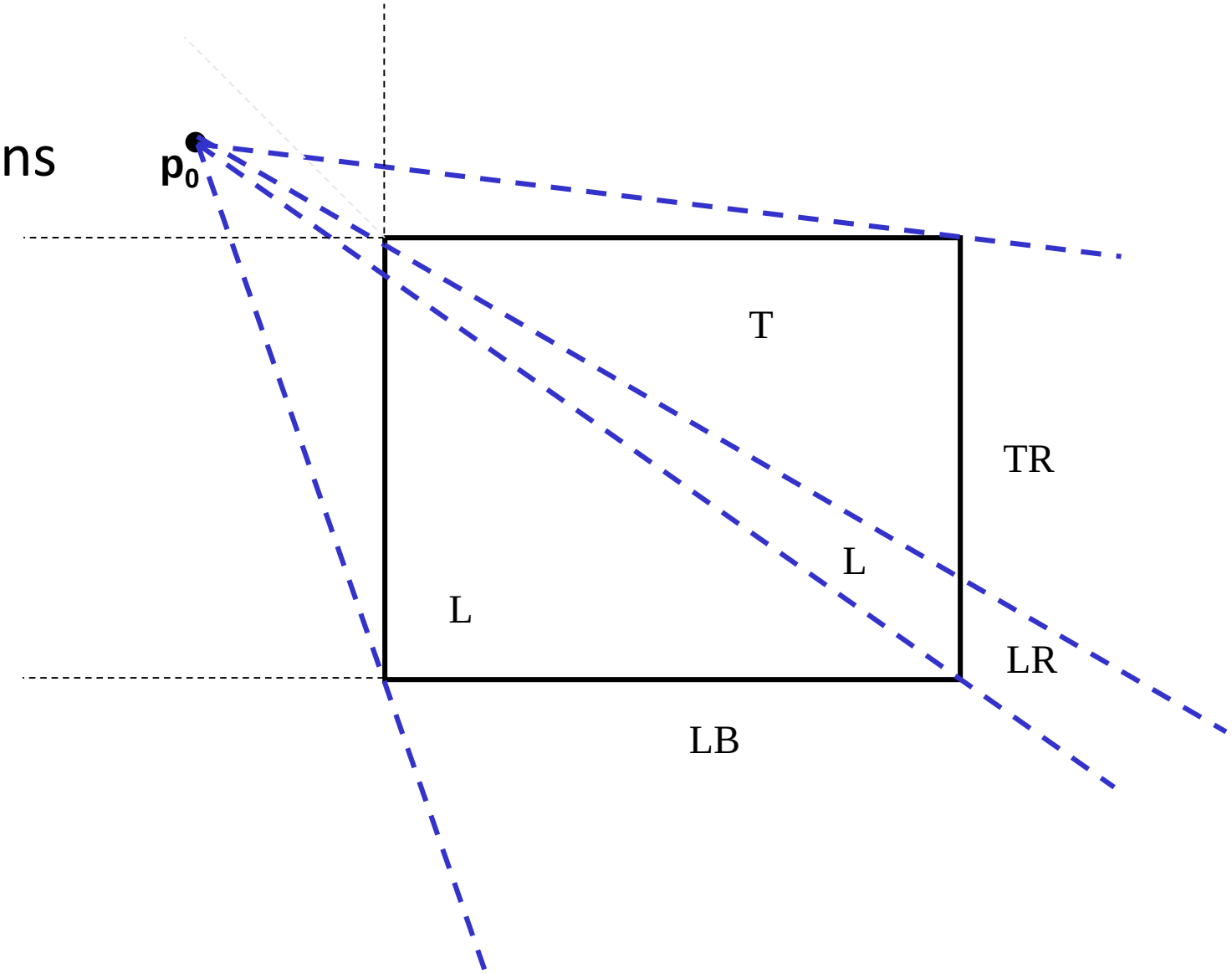
“Corner” case sub-regions for $\mathbf{p}_1$ (subcase I)

- 5 regions



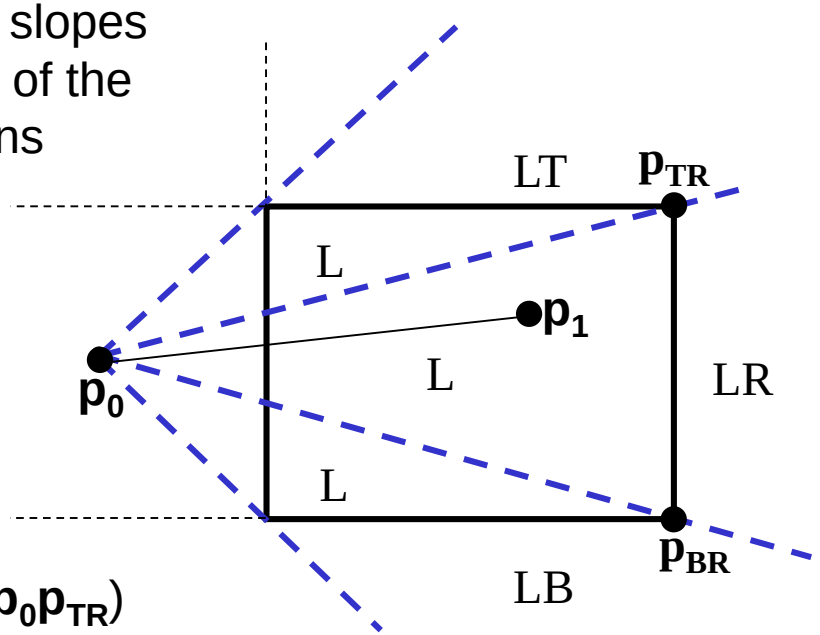
“Corner” case sub-regions for $\mathbf{p}_1$ (subcase II)

- 5 regions



Determining region of $\mathbf{p_1}$

- We determine the region of $\mathbf{p_1}$ by comparing slopes of line $\mathbf{p_0p_1}$ and the line from $\mathbf{p_0}$ to the corners of the clipping window that define the different regions (L,LT, etc.)



- For example

$\mathbf{p_1}$ is in LR when

$$\text{slope}(\mathbf{p_0p_{BR}}) < \text{slope}(\mathbf{p_0p_1}) < \text{slope}(\mathbf{p_0p_{TR}})$$

and

$\mathbf{p_1}.x < wx_{max}$ *(determined from standard region outcode)*

Nicholl-Lee-Nicholl versus CS & LB

- using more regions avoids multiple line-intersection tests of Cohen-Sutherland (CS)

- compared to both CS and Liang-Barsky (LB), NLN performs fewer comparisons and divisions

- however, CS and LB can be applied to 3D clipping. NLN can’t extend to 3D.