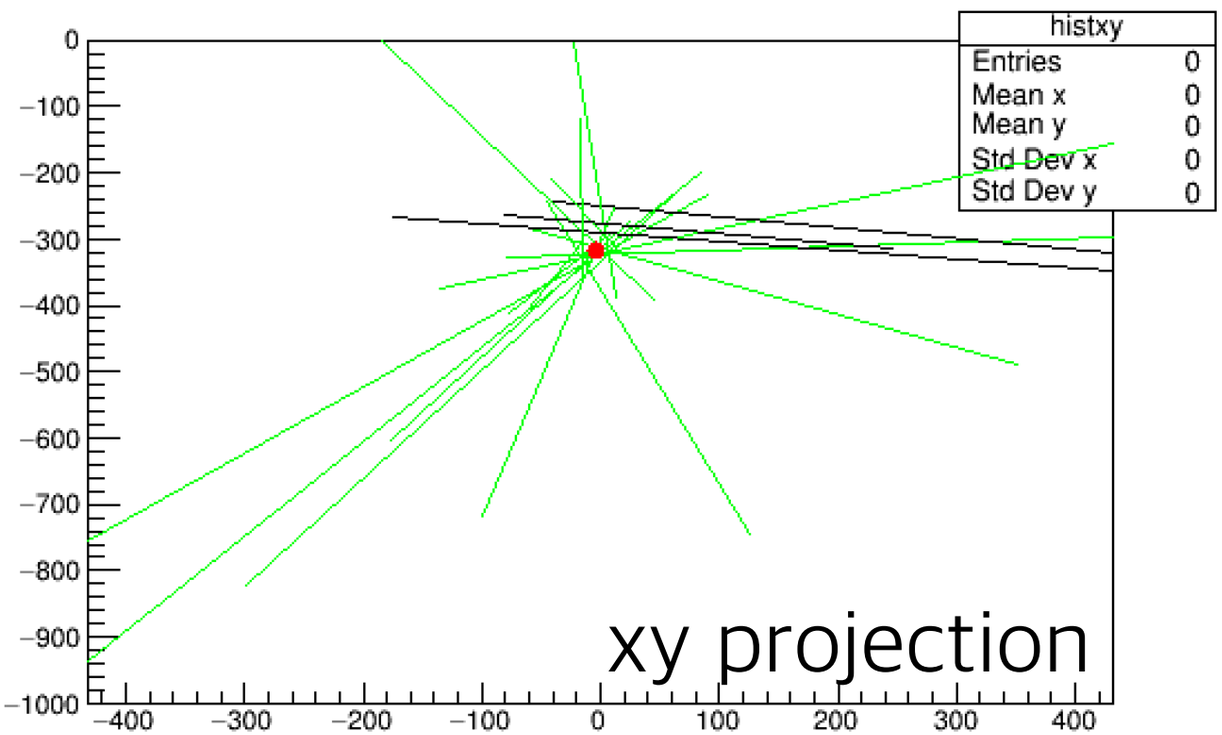
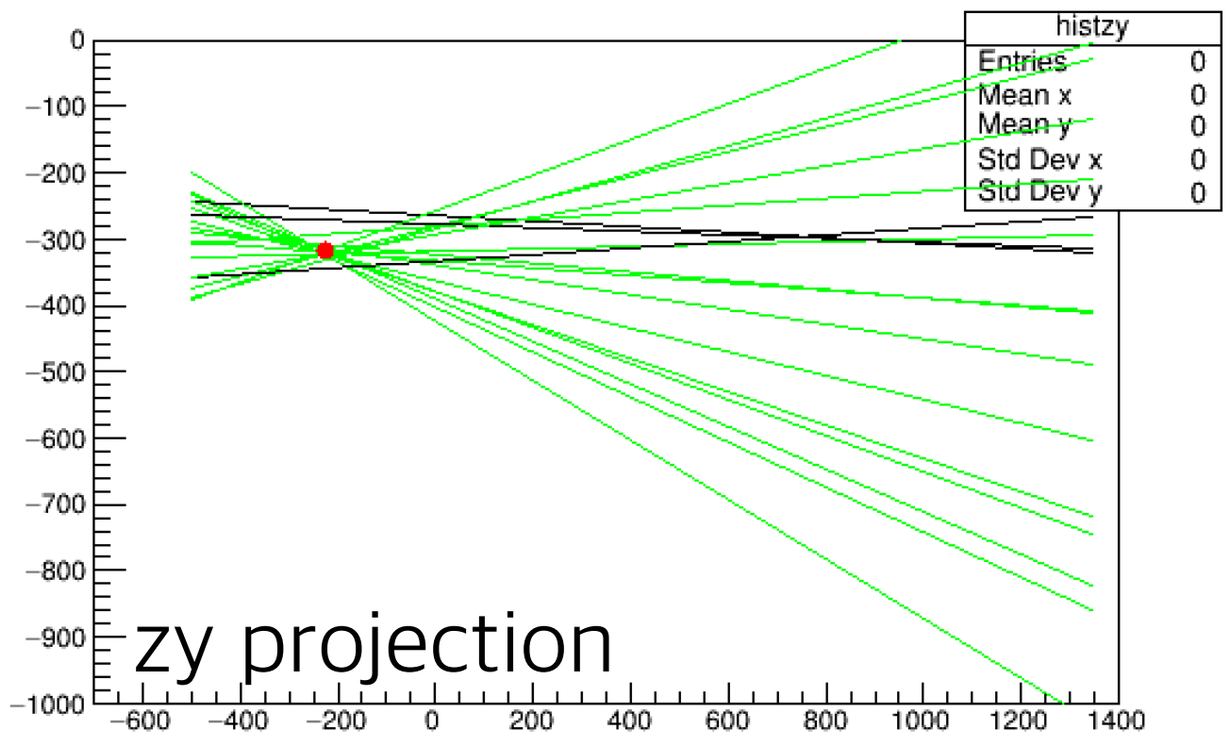
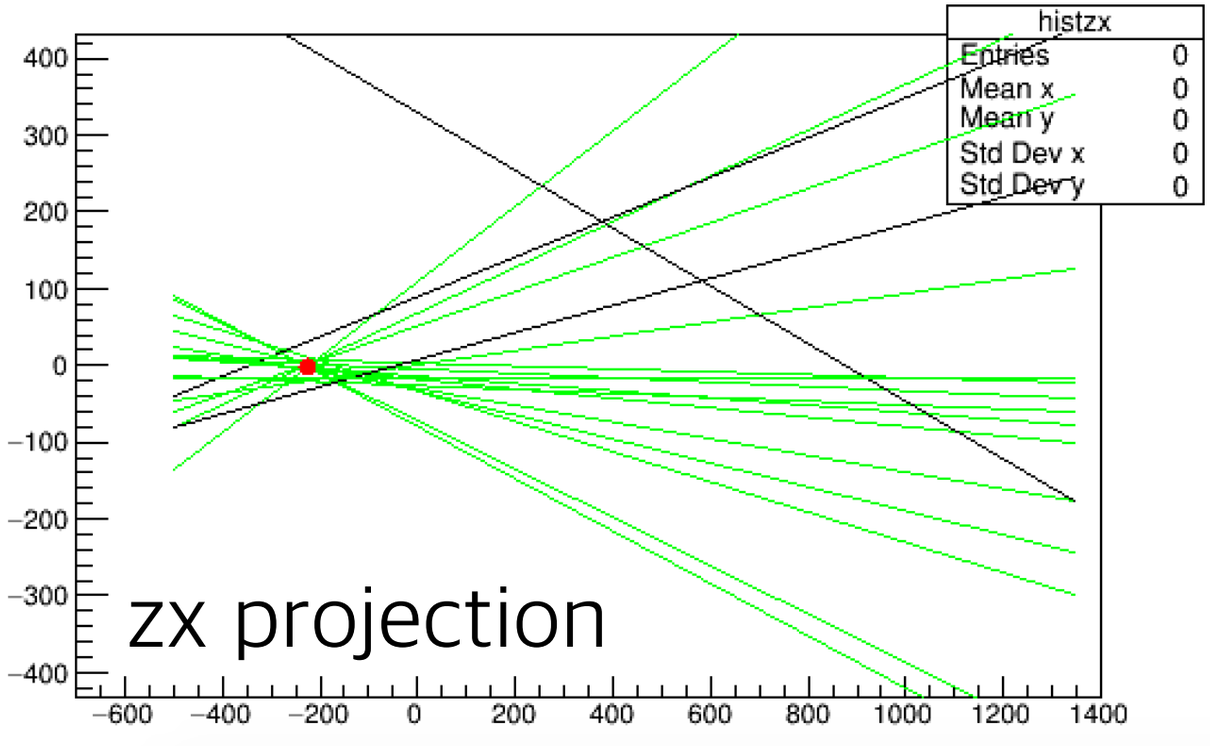
One example of the vertex finding

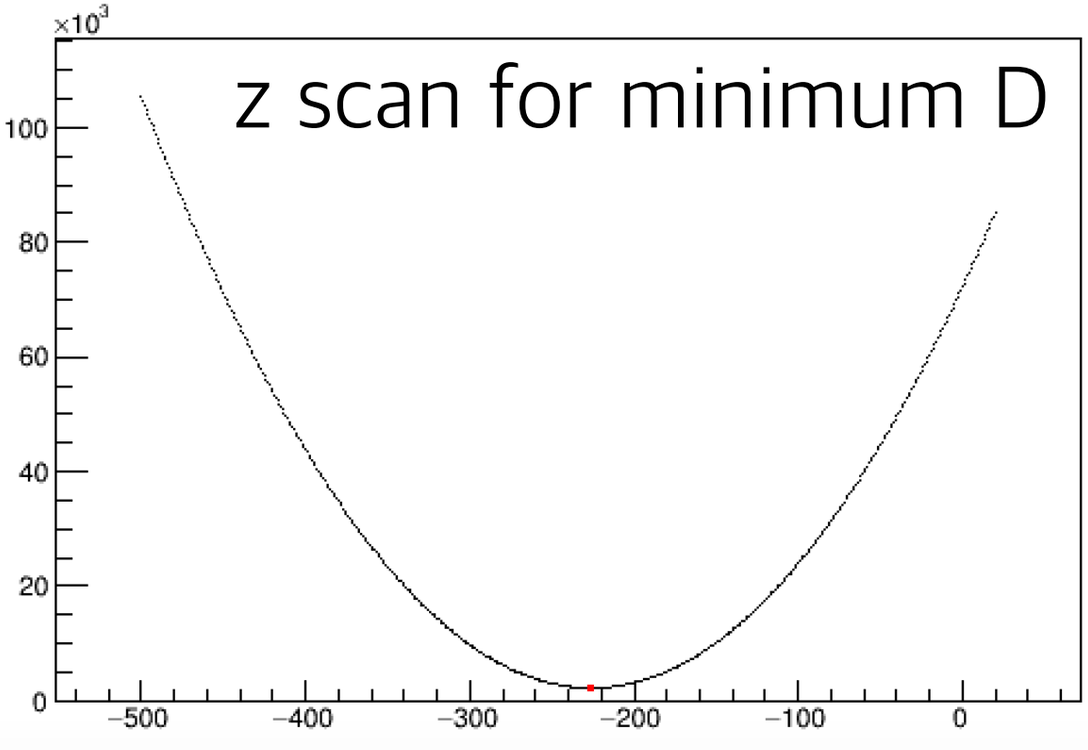




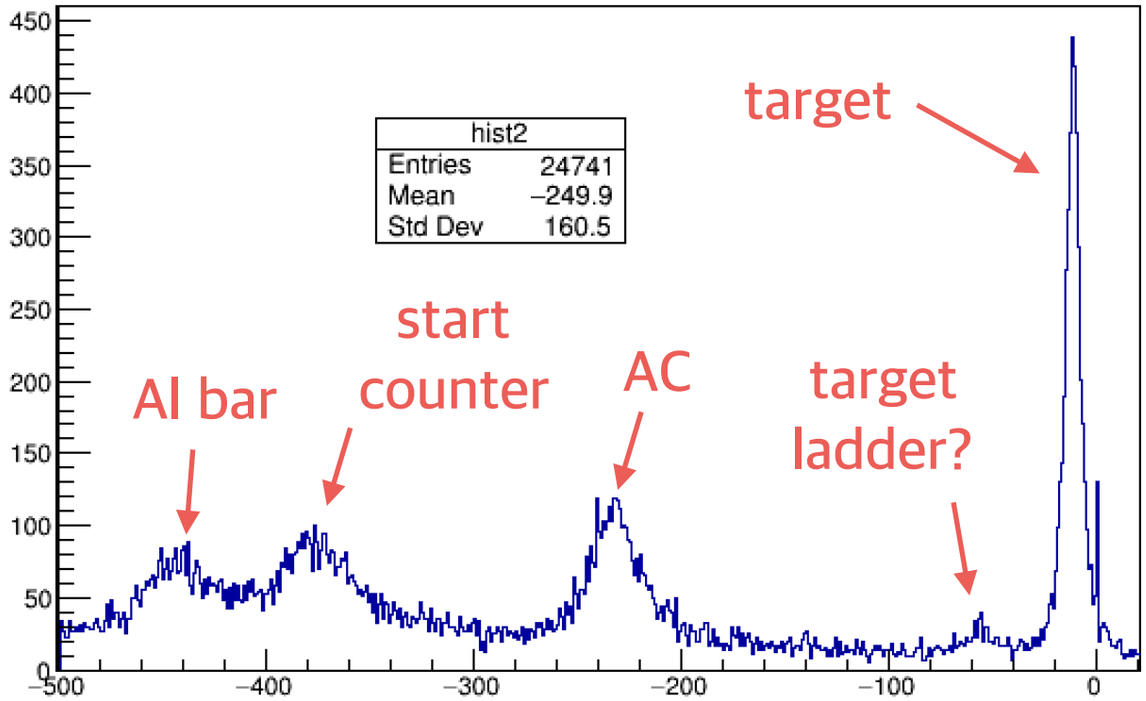
Green: selected tracks

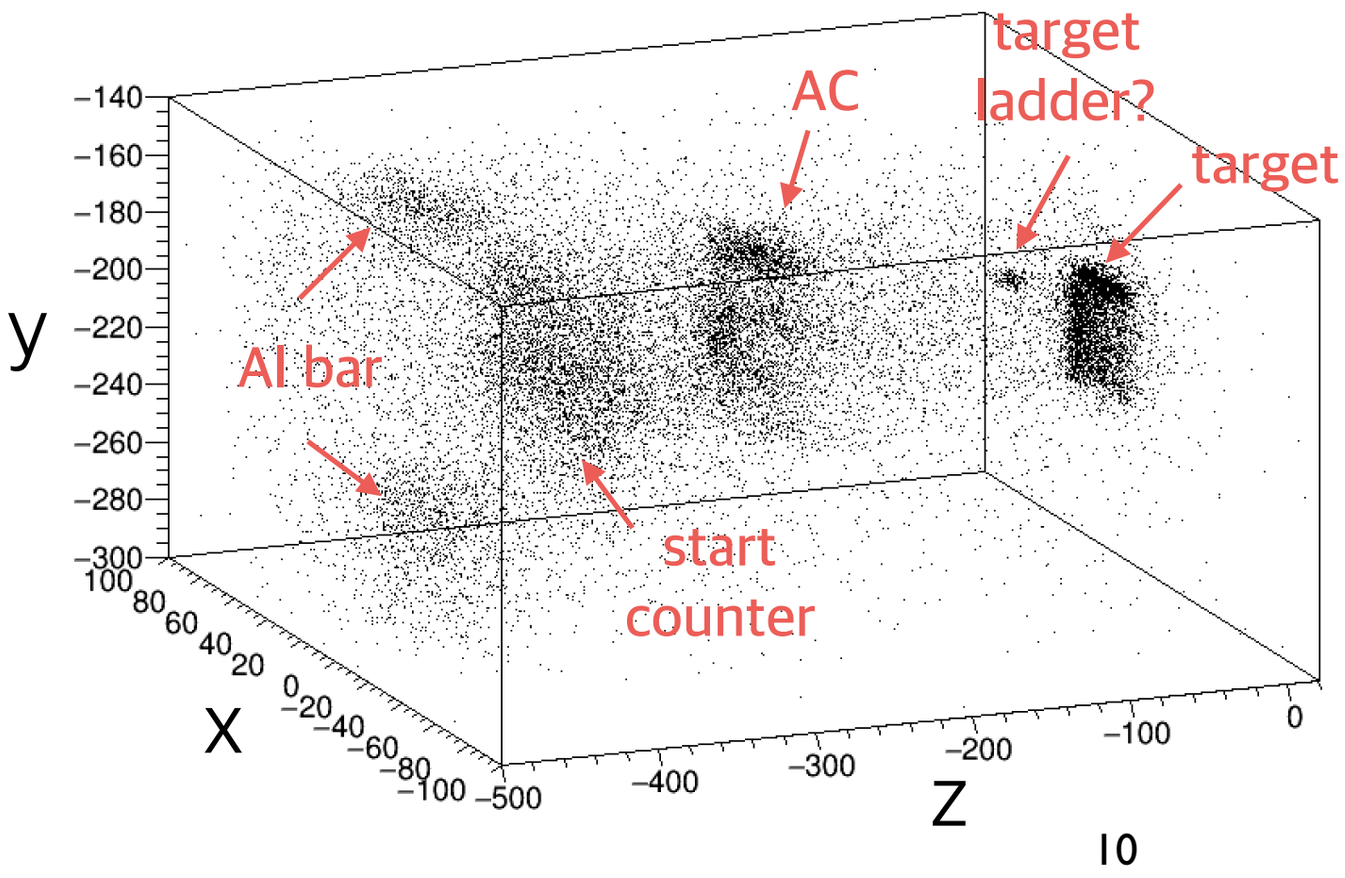


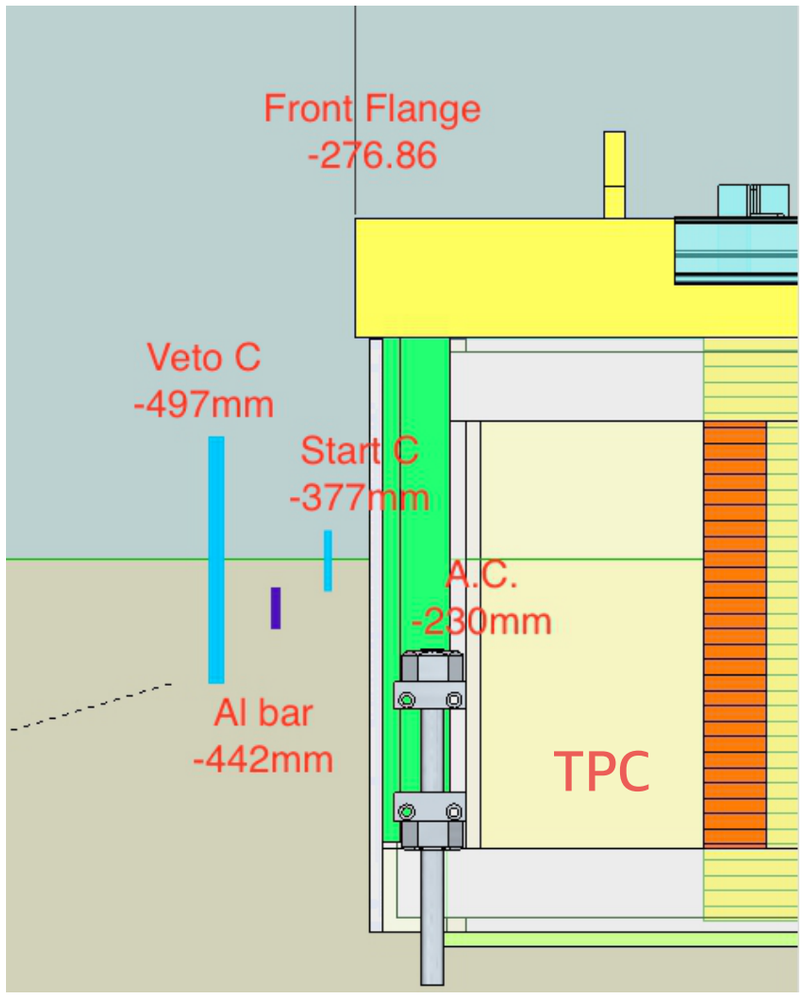
● : found vertex



Result


hist2
Entries 24741
Mean −249.9
Std Dev 160.5
target
start counter
AC
Al bar
target ladder?


target
AC
target ladder?
target
Al bar
start counter
y
X
Z


Front Flange
-276.86
Veto C
-497mm
Start C
-377mm
A.C.
-230mm
Al bar
-442mm
TPC

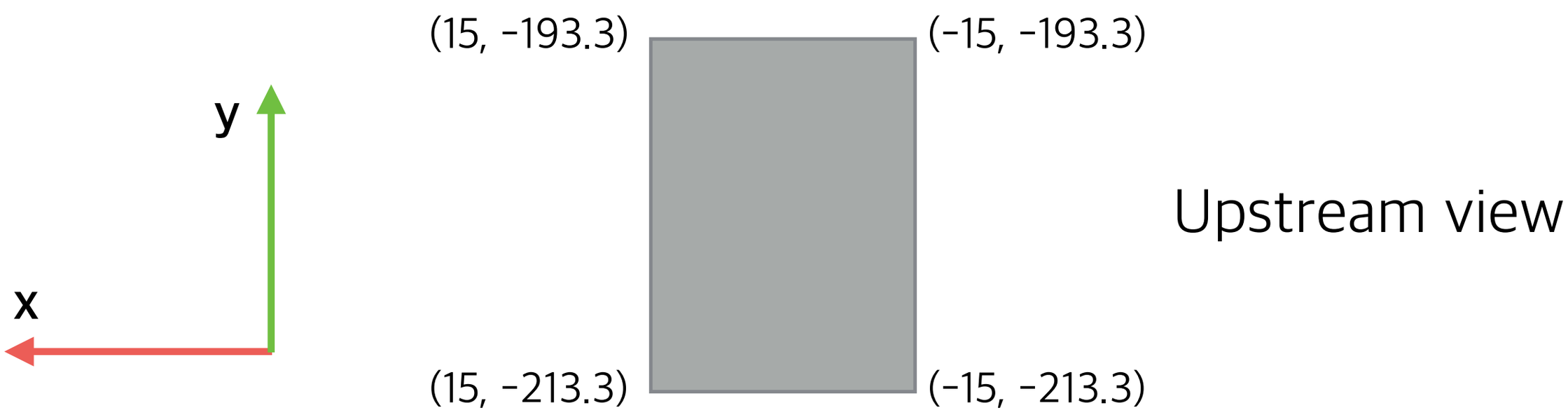
Vertex finding

Genie Jhang

2015. 12. 2

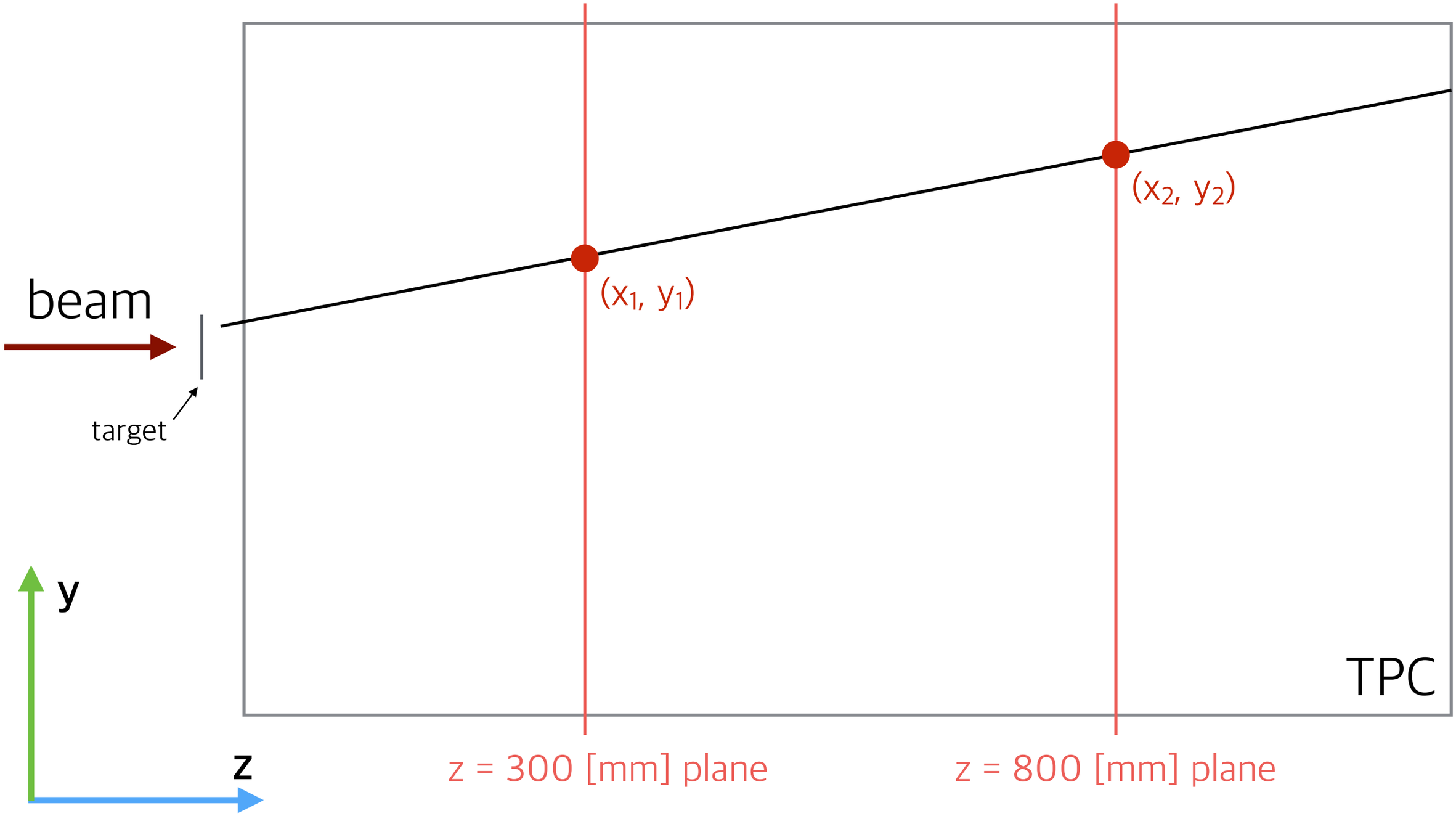
Parameters

- Target size: (x, y) = (30, 40) [mm]
- Target center (Sn): (x, y, z) = (0, -213.3, -8.9) [mm]
- Target sides (Sn):
  - (x_{Min}, y_{Min}, x_{Max}, y_{Max}) = (-15, -233.3, 15, -193.3) [mm]



Track selection method

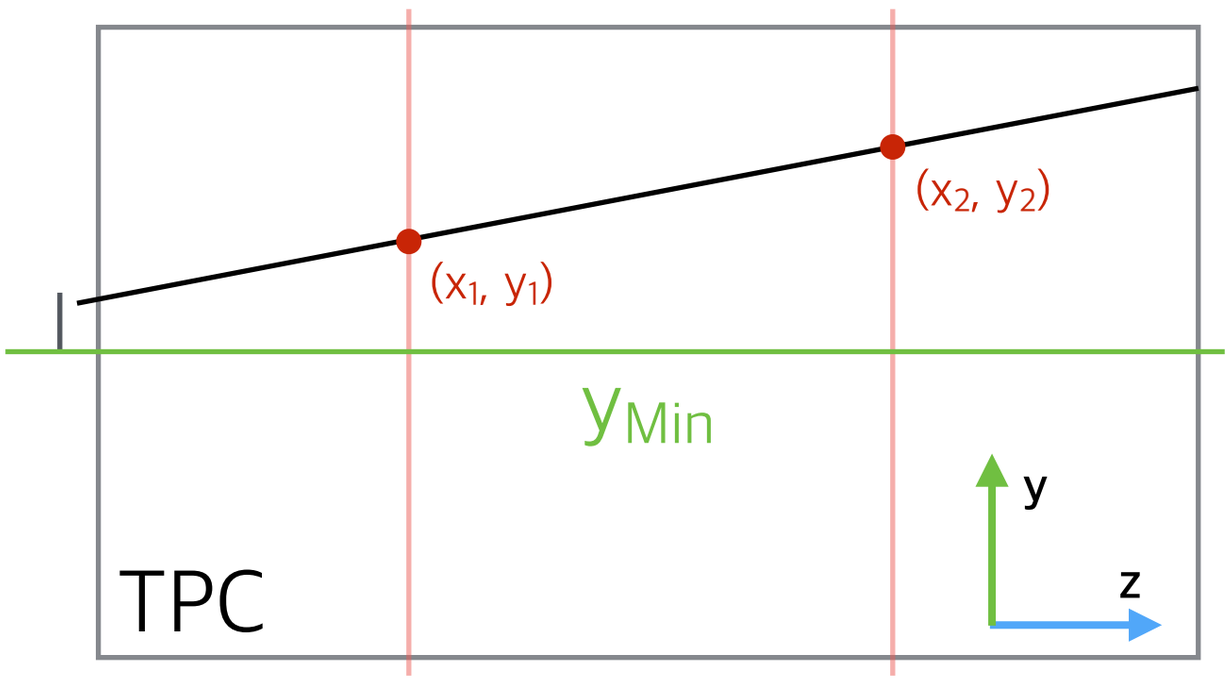
- Find crossing points (x, y) at z=300 and 800 planes.



Track selection method

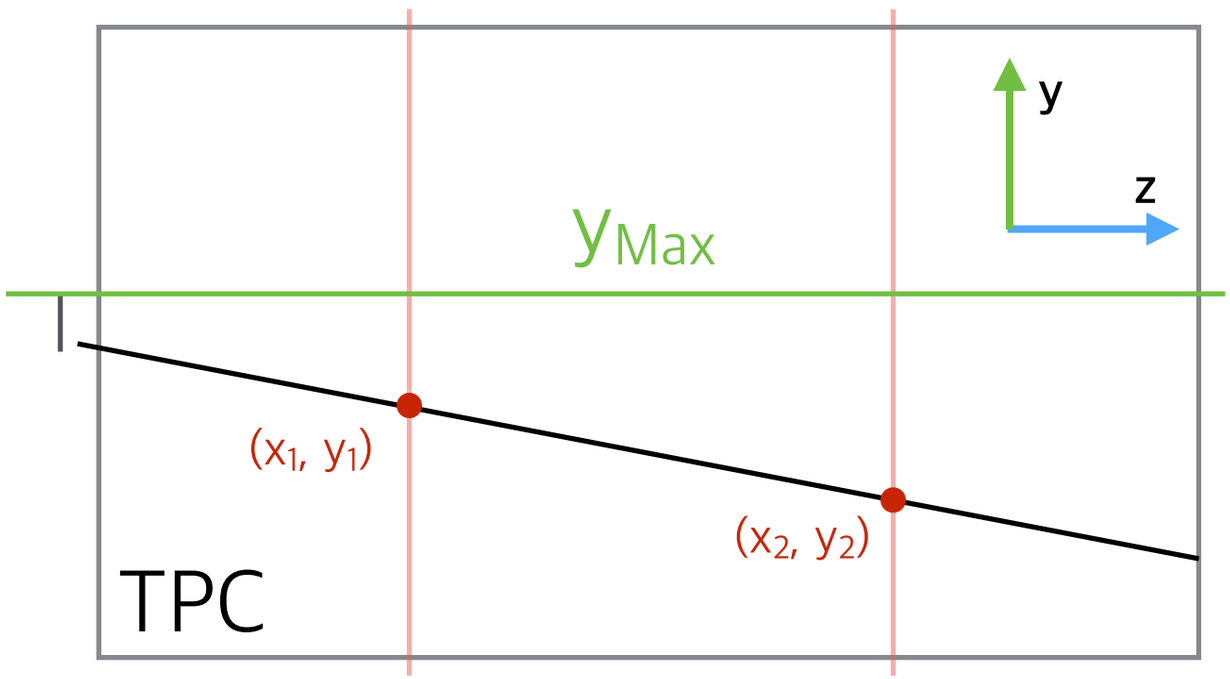
- The two points (x_1, y_1) and (x_2, y_2) must satisfy the following criteria.

For rising tracks



1. Both y_1 and y_2 must be above y_{Min}.
2. The slope should be positive.

For descending tracks

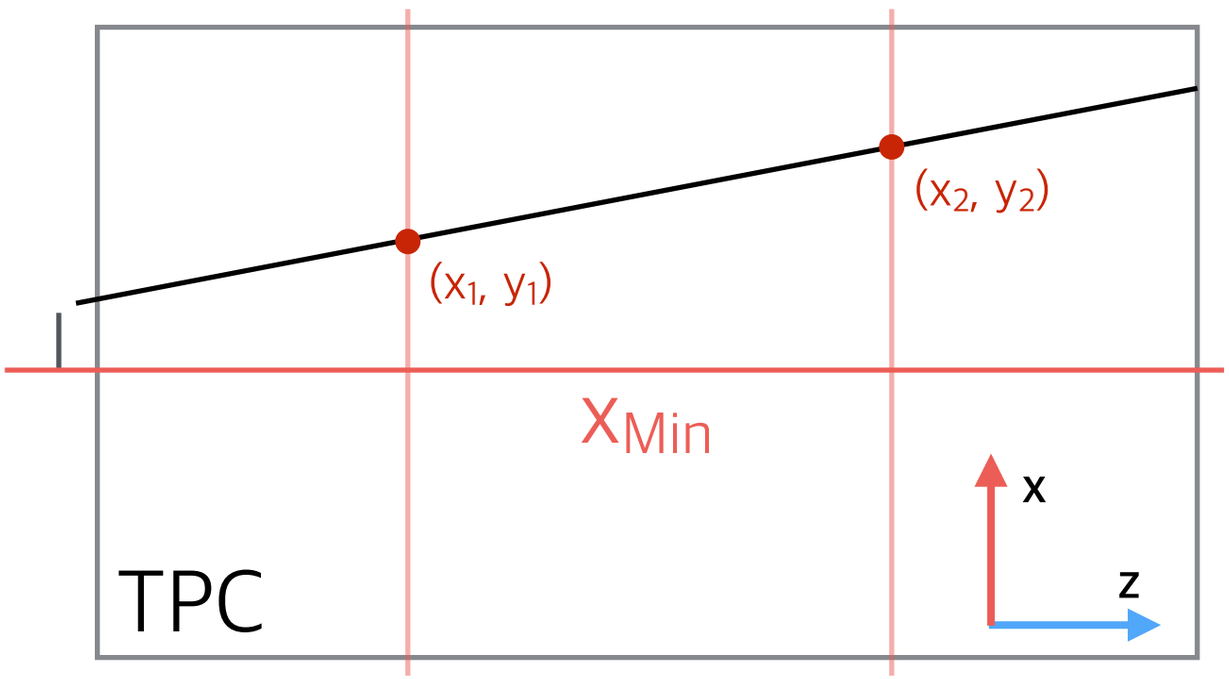


1. Both y_1 and y_2 must be below y_{Max}.
2. The slope should be negative.

Track selection method

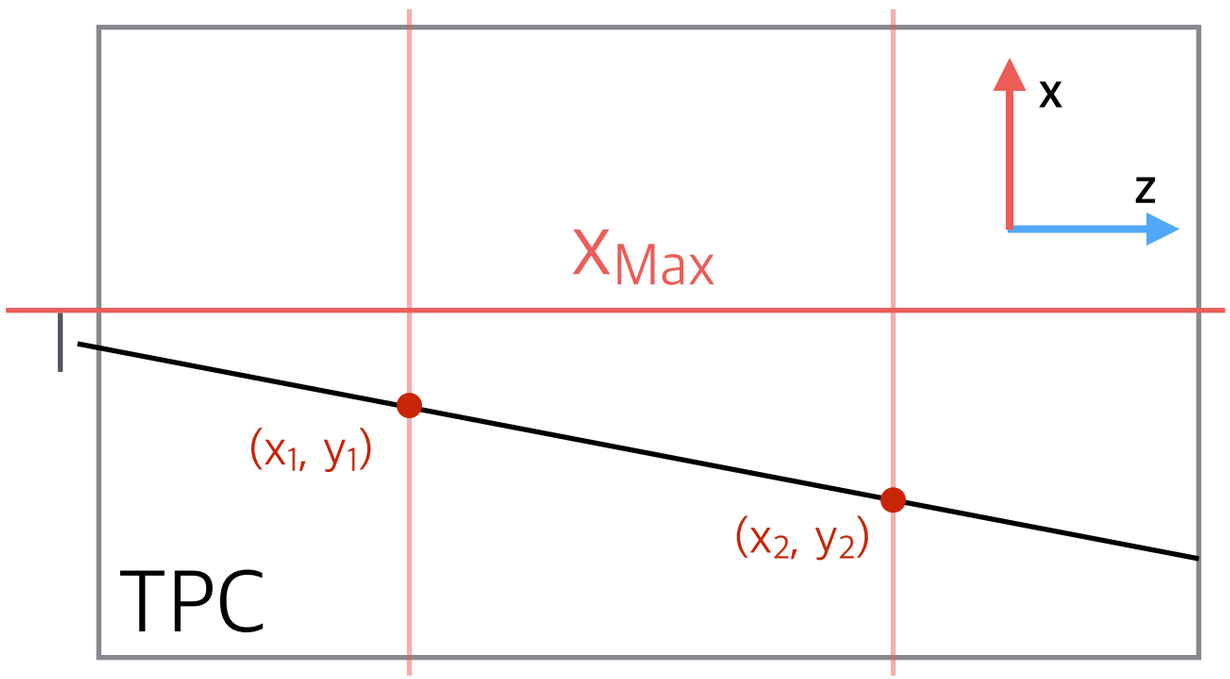
- The two points (x_1, y_1) and (x_2, y_2) must satisfy the following criteria.

For tracks going to beam-left



1. Both x_1 and x_2 must be above x_{Min}.
2. The slope should be positive.

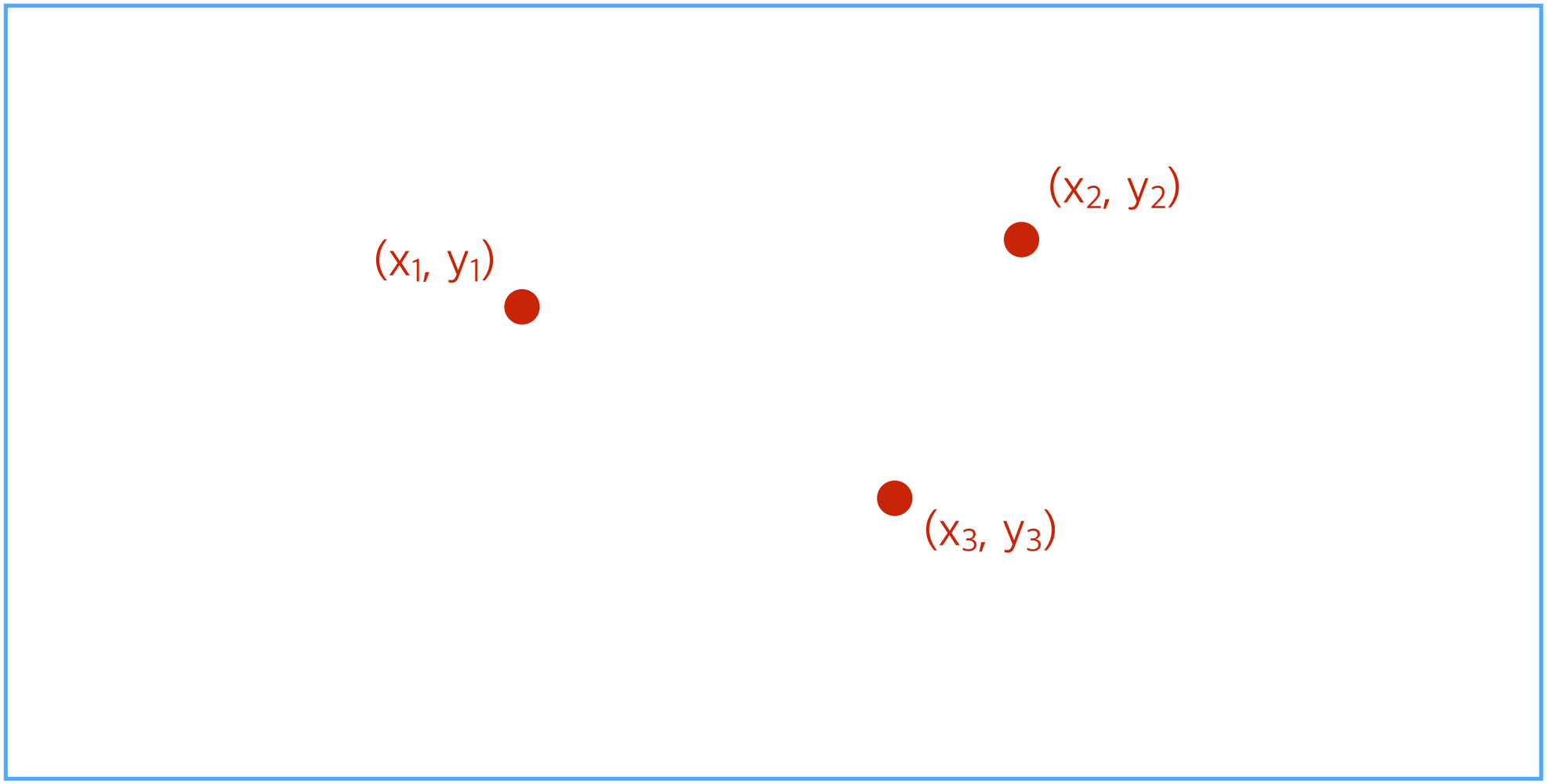
For tracks going to beam-right



1. Both x_1 and x_2 must be below x_{Max}.
2. The slope should be negative.

Vertex finding method

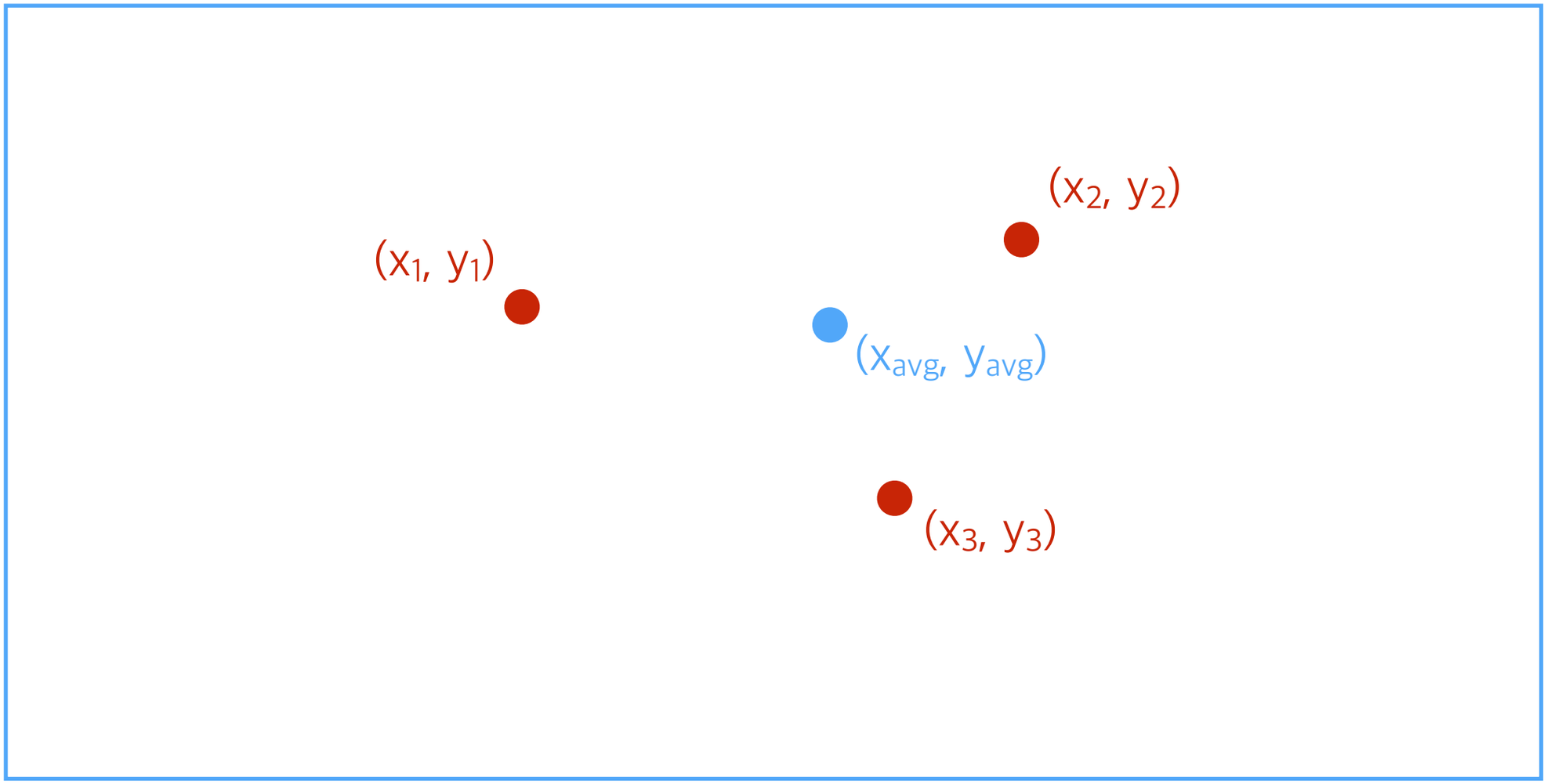
- For the tracks satisfying the criteria before, find the crossing points on the plane z = 10 [mm].
- Suppose we have three tracks crossing the plane.



Vertex finding method

1. Find the average point of all the points crossing the plane.

$$x_{\mathrm{avg}} = \sum x_i / N \qquad y_{\mathrm{avg}} = \sum y_i / N$$



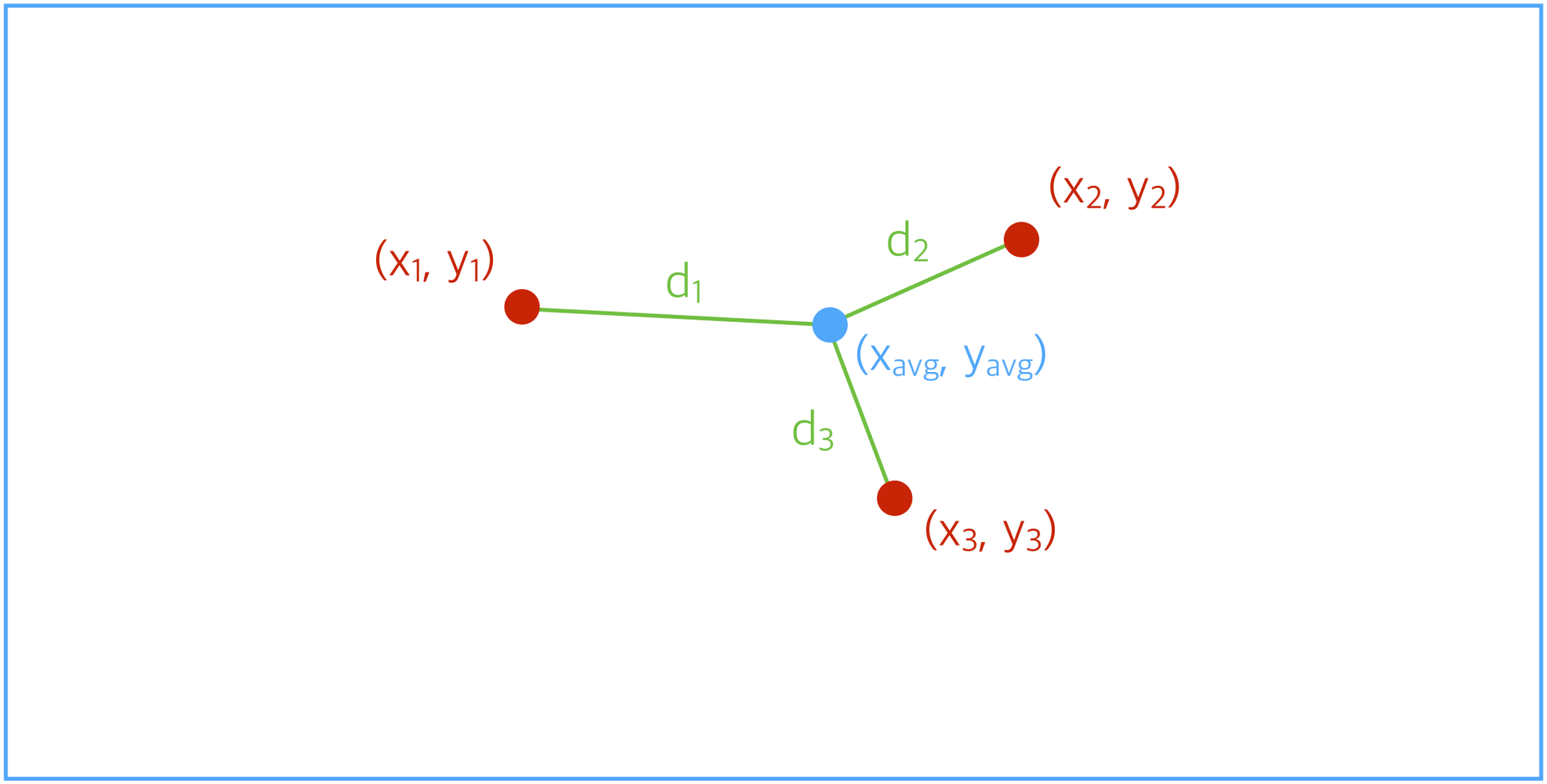
z = 10 [mm] plane

Vertex finding method

2. Calculate the sum of the distances between the average point to each point.

$$D = \sum d_i$$

3. Scan z from 10 to -500 [mm] to find the minimum D.



z = 10 [mm] plane