GL12: Descriptive Geometry

- Oblique planes
- Secondary auxiliary views
  - auxiliary plane perpendicular to primary auxiliary plane
- Dihedral angles
  - true angle between planes
- Perpendicular distances
- Applications
  - shadow problems
  - sections
Dihedral angle

- angle $\theta$ between planes
- seen when line of intersection viewed as a point
Example:

Dihedral angle between planes

Dihedral angle steps:

1. Project on to plane parallel to line of intersection → TL
2. Project on to plane perpendicular to LoI → point
Dihedral angle between planes

Dihedral angle steps:
1. Project on to plane 4 parallel to line of intersection AB → TL
2. Project on to plane 5 perpendicular to LoI → point
Example: Shortest distance between skew lines

1. Obtain TL view of AB (primary aux. plane 4 // AB)

2. Obtain end-on view of AB (secondary aux. plane 5 _|_ AB)

Shortest distance line seen in TL in this view
A, B, C are midpoints of sides of cube as shown.

Section problem

Intersection of plane containing ABC and cube - shape of profile?
Distance from hinge line 1-4 ...

= depth below top plane

horizontal line in the plane

= distance from hinge line 1-2 ...

primary auxiliary plane

hinge line 1-4

hinge line 1-2
primary auxiliary view

edge view of plane ABC
Distance from hinge line 1-4 ...

Distance from hinge line 4-5 ...

hinge line 1-4

hinge line 4-5

= distance from hinge line 1-4 ...

= distance behind aux. plane 4

secondary auxiliary plane

primary auxiliary plane
primary auxiliary view

secondary auxiliary view

edge view of plane ABC
Verification of solution with Cartesio (isometric projection)

Define points on cutting plane

A (0, -0.5, 0)
B (0.5, 0.5, 0.5)
C (0.5, 0.1)