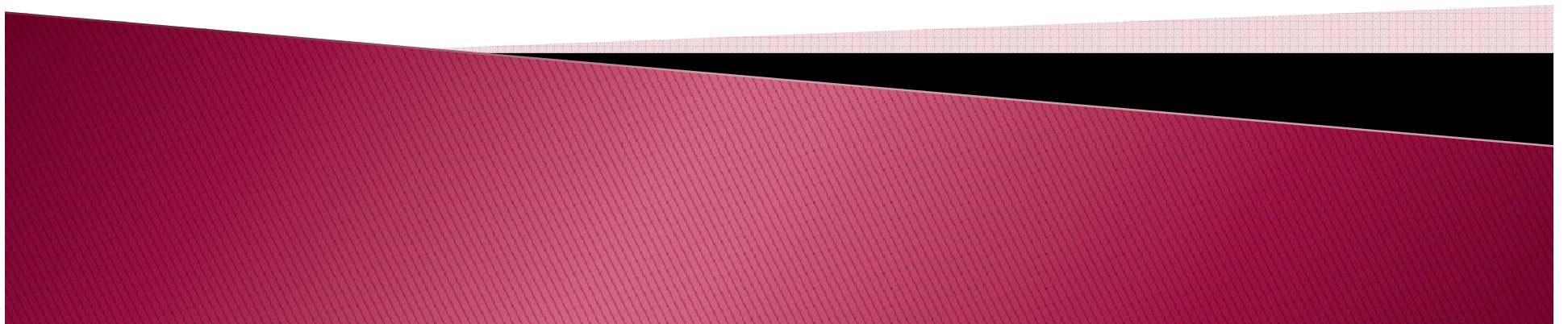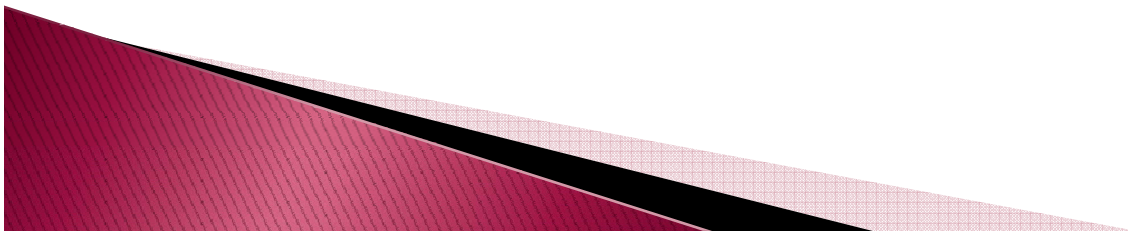# SOLID GEOMETRY

TOPIC 4:
LINE PERPENDICULARTO PLANE

DEFINITION

▸ If a straight line drawn to a plane is perpendicular to every straight line that passes through its foot and lies in the plane, it is said to be **perpendicular to the plane.**

▸ When a line is perpendicular to a plane, the plane is also said to be **perpendicular to the line.**

THEOREMS

- If a line is perpendicular to each of two other lines at their point of intersection, it is perpendicular to the plane of the two lines.
- Let n be a line perpendicular to two intersecting lines k and l in the plane α. Then n is perpendicular to every line in α, hence n ⊥ α.
- For every line l and every point P there is a unique plane α through P such that l ⊥ α.
- Two planes α and β that are perpendicular to the same line n are parallel.
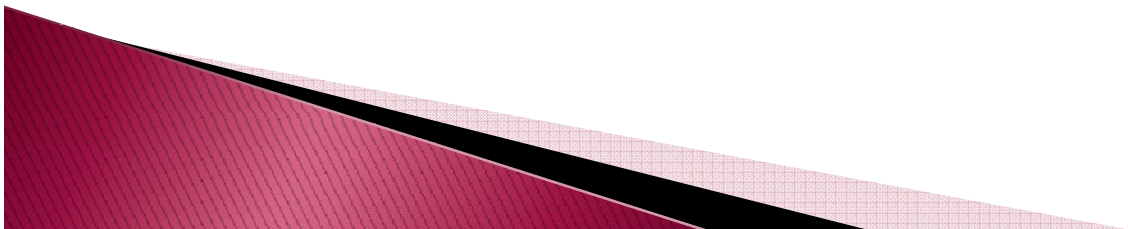
- All the perpendiculars that can be drawn to a given point lie in a plane which is perpendicular to the given line at the given point.
- Through a given point in a given line one plane, and only one, can be passed perpendicular to the line.
- Through a given external point one plane, and only one, can be passed perpendicular to a given line.
- Through a given point in a plane there can be drawn one line perpendicular to the plane, and only one.
- Through a given external point there can be drawn one line perpendicular to a given plane, and only one.
- The perpendicular is the shortest line from a point to a plane. The length of this perpendicular is called the **distance** from the point to the plane.
- Two planes α and β that are perpendicular to the same line n are parallel.

- A line that meets a plane but is not perpendicular to it is said to be **oblique** to the plane. Oblique lines drawn from a point to a plane, meeting the plane at equal distances from the foot of the perpendicular, are equal; and of two oblique lines, meeting the plane at unequal distances from the foot of the perpendicular, the more remote is the greater.