Representations for planes

A plane passes through a point and has a given “direction”

Direction of plane is given by its normal

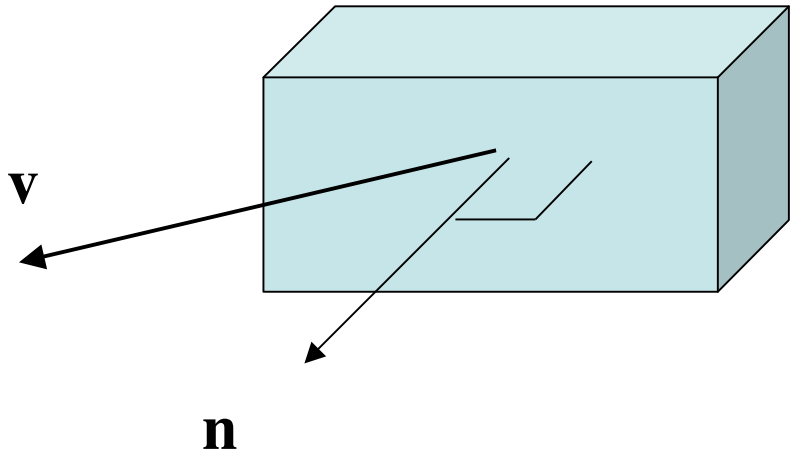
$$(\mathbf{X} - \mathbf{X_0}) \bullet \hat{\mathbf{n}} = \mathbf{0} \quad \Leftrightarrow \quad \mathbf{ax + by + cz = k}$$

A half space is defined by $(\mathbf{X} - \mathbf{X_0}) \bullet \hat{\mathbf{n}} \geq 0$

Visibility - Back Face Culling

- Sections of surfaces of modeling solid objects have a front face and back face
- The normal encodes which way is inside and which way is outside
- If the viewer sees the surface section from the back side (the back face is the visible one), then the section should not be displayed.

Visibility - Back Face Culling



v is direction from a point on the plane to the center of projection (the camera).

If $\mathbf{n}.\mathbf{v} > 0$, then display the plane

Note that we are calculating which side of the plane the eye is on.

If the object was curved, the above is still valid, but now you use the **tangent** plane.