CLASS#6 // MAC2313 - 55810 // Thu. 5/17-07

I. Return POD#04; Collect POD#05;
Assign POD#06: 8.13.5: p.866: #34.

II. More out of §13.5 (Lines & Planes).

A. Finding Parametric Equations for the line of intersection of 2 planes.

Example 8.13.5: p.867: #53: Find parametric equations for the line of intersection of the planes.

\[ \Pi_1: z=x+y \quad \Pi_2: 2x-5y-z=1 \]

Solution: \[ \vec{n}_1 \perp \Pi_1: \vec{n}_1 = <1,1,-1> \]

\[ \Pi_1: x+y-z=0 \quad \Pi_2: 2x-5y-z=1=0 \]

and \[ \vec{n}_2 \perp \Pi_2: \vec{n}_2 = <2, -5, -1> \]

2. Let \[ \vec{v} = \vec{n}_1 \times \vec{n}_2 = <1,1,-1> \times <2, -5, -1> \]

\[ = <-1-5, -2+1, -5-2> = <-6, -1, -7> \]

3. Find a point on the line of intersection.
Find \( P_0 \in \Pi_1 \cap \Pi_2 \)

Thus I must solve simultaneously, the system

\[ x+y-z=0 \quad (*) \quad \text{Suppose } y=0 \]

\[ 2x-5y-z=1 \]

Then (*) becomes \[ z-z=0 \]

\[ 2z-z=1 \]

\[ \Rightarrow \begin{cases} -x+z=0 \\ 2x-z=1 \\ x=1 \quad \therefore \quad z=1 \\ \therefore \quad P_0(1,0,1) \end{cases} \]

Thus the parametric equations for the line of intersection of \( \Pi_1 \) and \( \Pi_2 \) are

\[ x=1-6t \]

\[ y=0-1 \]

\[ z=1-7t \]

III. §13.6: Cylinders and Quadric Surfaces, p.868.

A. Cylinders; (General Cylinder)

1. plane curve as the base (directrix)
2. line that intersects the plane (generator)
3. rulings - lines parallel to the generator which also pass through the directrix.
Quadric Surfaces, p.869.

1. Def: General Eq. for a Quadric Surface

\[ Ax^2 + By^2 + Cz^2 + Dxy + Eyz + Fxz + Gx + Hy + Iz + J = 0 \]

2. If \( D = E = F = 0 \)

\[ Ax^2 + By^2 + Cz^2 + Gx + Hy + Iz + J = 0. \]

If \( A = B = C \neq 0, \) then the Quadric is either a sphere or nothing, (which could be a point)

LEARN.

3. Chart p. 872. 

DO.


IV.

POD #6: & 13, 5: p. 866; #34.