INSTRUCTOR: RUIWEN SHU

Section 2.5:

Vector equation for a line: $\mathbf{r}(t) = \mathbf{r}_0 + t\mathbf{v}$, where $\mathbf{v}$ is a direction vector, and $\mathbf{r}_0$ is the position vector of a point on the line.

Equation for a plane: $a(x - x_0) + b(y - y_0) + c(z - z_0) = 0$, where $\langle a, b, c\rangle$ is a normal vector, and (x_0, y_0, z_0) is a point on the plane.

Distance from a point P to a line: $\frac{\|\overrightarrow{PM}\times\mathbf{v}\|}{\|\mathbf{v}\|}$, where $\mathbf{v}$ is a direction vector of the line, and M is a point on the line.

Distance from a point P to a plane: $\frac{|\overrightarrow{QP}\cdot\mathbf{n}|}{\|\mathbf{n}\|}$, where $\mathbf{n}$ is a normal vector of the plane, and Q is a point on the plane.

Line of intersection between two planes: its direction vector is $\mathbf{v} = \mathbf{n}_1 \times \mathbf{n_2}$, where $\mathbf{n}_1$ and $\mathbf{n}_2$ are the normal vectors of the two planes. To find a point on the line, look for (x, y, z) satisfying the equations for both planes.

Angle between two planes: $\cos^{-1}(\frac{\mathbf{n}_1\cdot\mathbf{n_2}}{\|\mathbf{n}_1\|\cdot\|\mathbf{n_2}\|})$, where $\mathbf{n}_1$ and $\mathbf{n}_2$ are the normal vectors of the two planes.