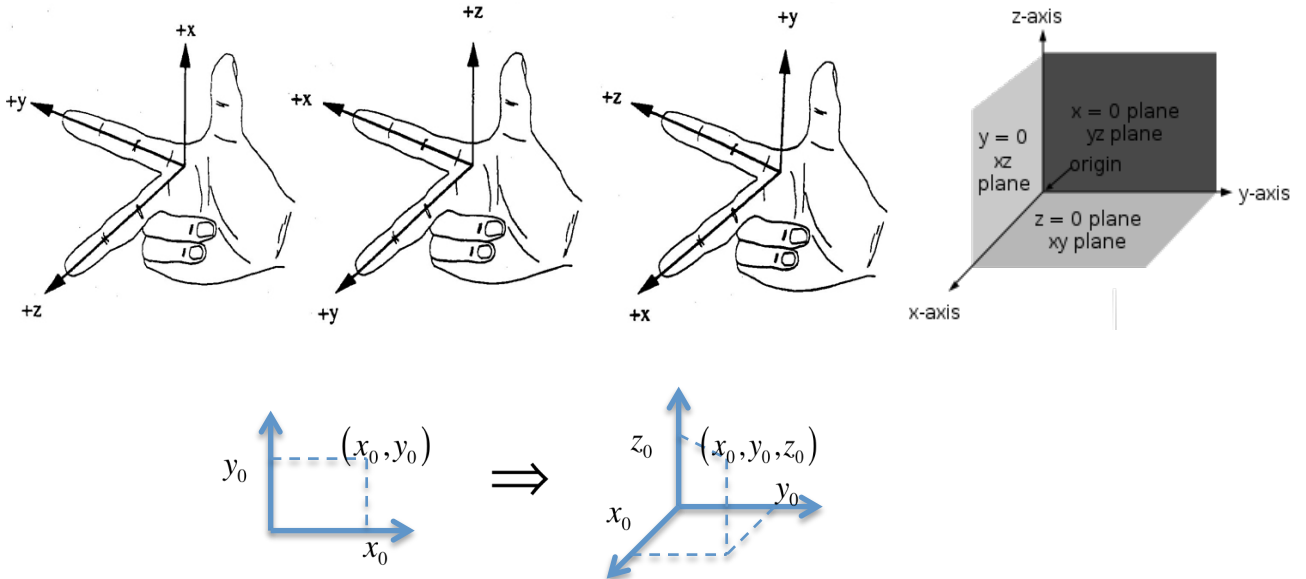


Handout 7

Righ-handed coordinate system



Definition: Plane in 3D is given by the formula $Ax + By + Cz = D$

Definition: Euclidian Distance formula between points $P_1 = (x_1, y_1, z_1)$ and $P_2 = (x_2, y_2, z_2)$ in space (3D) denoted as $|P_1P_2|$ and given as

$$|P_1P_2| = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2 + (z_2 - z_1)^2}$$

Compare to the Euclidian Distance formula between points $P_1 = (x_1, y_1)$ and $P_2 = (x_2, y_2)$ in plane (2D) that are given as $|P_1P_2| = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$.

Definition: A sphere centered at 0 is given by formula $x^2 + y^2 + z^2 = r^2$. If it centered at $P_1 = (x_1, y_1, z_1)$, then it is given by $(x - x_1)^2 + (y - y_1)^2 + (z - z_1)^2 = r^2$. Compare to the equation of circle centered at 0 $x^2 + y^2 = r^2$ or $(x - x_1)^2 + (y - y_1)^2 = r^2$ centered at $P_1 = (x_1, y_1)$.