

RELATIVE MOTION IN TWO DIMENSIONS

Relative Motion of Projectiles

Ground frame

$$\vec{u}_A = u_A \cos \theta_A \hat{i} + u_A \sin \theta_A \hat{j}$$

$$\vec{a}_A = -g \hat{j}$$

$$\vec{u}_B = u_B \cos \theta_B \hat{i} + u_B \sin \theta_B \hat{j}$$

$$\vec{a}_B = -g \hat{j}$$

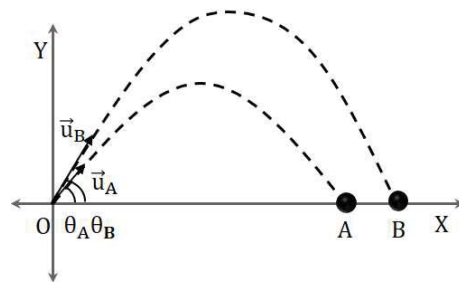
Frame A

$$\vec{u}_{AA} = 0$$

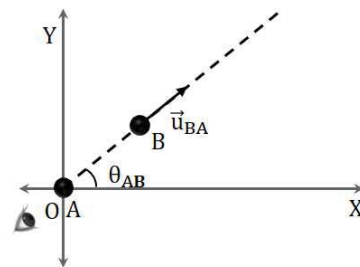
$$\vec{a}_{AA} = 0$$

$$\vec{u}_{BA} = (u_B \cos \theta_B - u_A \cos \theta_A) \hat{i} + (u_B \sin \theta_B - u_A \sin \theta_A) \hat{j}$$

$$\vec{a}_{BA} = -g \hat{j} - (-g \hat{j}) = 0$$



Ground frame



Frame A