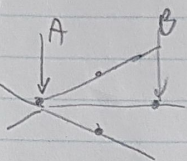
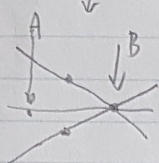


(2): Theory in picture:

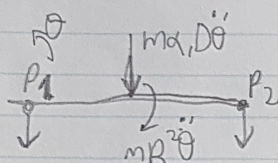
If  $\rightarrow$



Then  $\rightarrow$



From lab manual, we know that:



$$\sum M_2 = m\alpha_1 D\ddot{\theta}\alpha_2 D - mR^2\ddot{\theta} + P_1 D = 0$$

and for  $P_1 = 0$ ,  $D^2 = R^2/\alpha_1\alpha_2$

When rotation is around pt 1 & center of percussion is pt 2

and if theory is true, then conversely the bar will rotate

around pt 2, and  $P_1$  will be center of percussion ( $P_2 = 0$ ),

and equation should still satisfy  $D^2 = R^2/\alpha_1\alpha_2$  if they're equivalent.

To prove this we take moment around pt 1:

$$\sum M_1 = 0 = m\alpha_2 D\ddot{\theta}\alpha_1 D + mR^2\ddot{\theta} + P_2 D$$

and when  $P_2 = 0$ :

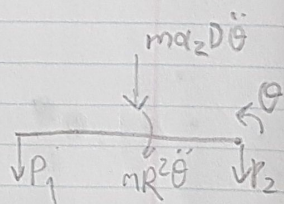
$$0 = m\alpha_2 D\ddot{\theta}\alpha_1 D + mR^2\ddot{\theta}$$

$$0 = \alpha_1 D^2 + R^2$$

$$D^2 = \frac{-R^2}{\alpha_1\alpha_2}$$

$$\rightarrow -\alpha_1^2 = \alpha_1\alpha_2$$

New FBD:



Therefore, the proposed theory is true.