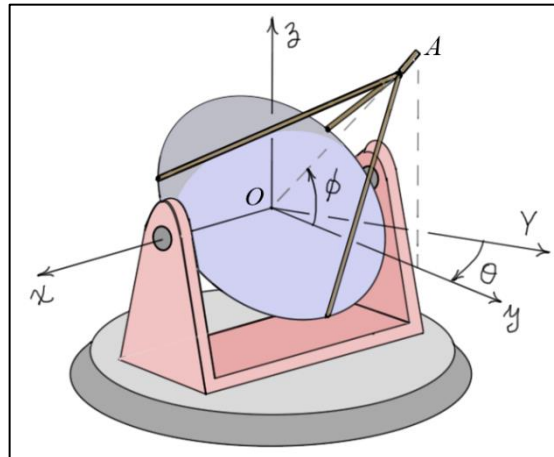


Intermediate Dynamics

Exercises #2A

- 1) The antenna system shown has two components, the base B and the antenna dish D . The distance from O to A is L . At any instant, the angle between the rotating y -axis and the fixed Y -axis is given by the angle θ , and the angle between OA and the y -axis is given by the angle ϕ . Calculate \underline{v}_A and \underline{a}_A the velocity and acceleration of point A using the formulae for two points **fixed** on a rigid body. (The problem comes from Hibbeler, *Engineering Mechanics*, 1998)



- 2) The system shown has **three components**, a vertical column C , a horizontal arm M , and a disk D . The disk has radius r and rotates relative to the arm at a rate of ω_3 (rad/sec). The arm has length L and rotates relative to the column at a rate of ω_1 (rad/sec). The column rotates at a rate of ω_2 (rad/sec) relative to the ground. Calculate \underline{v}_A and \underline{a}_A the velocity and acceleration of point A using the formulae for two points **fixed** on a rigid body. The angular rates ω_i ($i=1,2,3$) are **not** constant.

