

P14

- (a) Let the ellipse be chosen in the xy plane of Fig. 14-1. The particle of mass m moving on the ellipse has coordinates (x, y) . However, since we have the transformation equations $x = a \cos \theta$, $y = b \sin \theta$, we can specify the motion completely by use of the generalized coordinate θ .

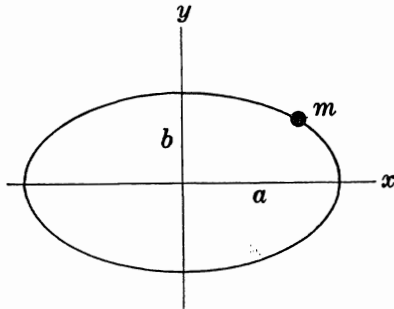


Fig. 41-1

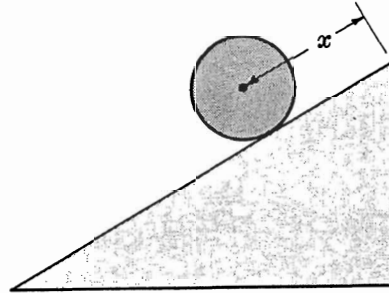


Fig. 41-2

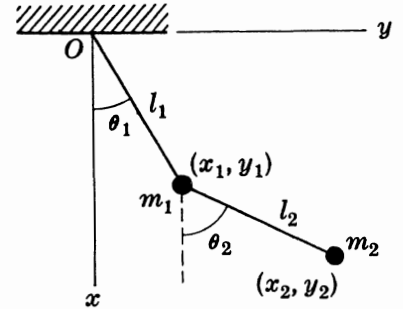


Fig. 41-3

- (b) The position of the cylinder [Fig. 14-2 above] on the inclined plane can be completely specified by giving the distance x traveled by the center of mass and the angle θ of rotation turned through by the cylinder about its axis.

If there is no slipping, x is related to θ so that only one generalized coordinate [either x or θ] is needed. If there is slipping, two generalized coordinates x and θ are needed.

- (c) Two coordinates θ_1 and θ_2 completely specify the positions of masses m_1 and m_2 [see Fig. 14-3 above] and can be considered as the required generalized coordinates.