Theoretical Mechanics, Quiz 8: COM LINEAR

Motion of the centre of mass of a system

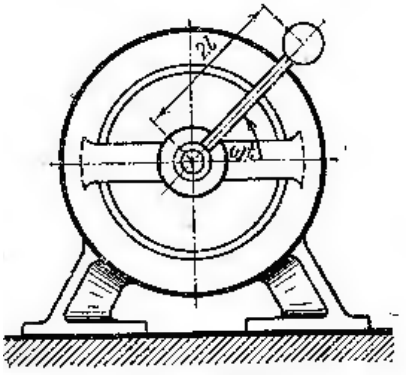
INNOPOLIS UNIVERSITY

Quiz 8

There are the motor (mass M_1), the steel shaft (mass M_2, length $2l$) and the ball (mass M_3). The angular velocity of the shaft equal to ω. The initial position of the shaft is horizontal.

You should write conditions for each body, make force analysis, and provide equations.

1. The motor is not fixed, no friction. It's needed to find a distance along the ground if the motor swing a shaft from 0 to α degree.
2. The motor is fixed. Find a reaction force among x axis.
3. The motor is not fixed, high friction. You need to find a min ω, when motor get off the ground.



Quiz 8, Task 1