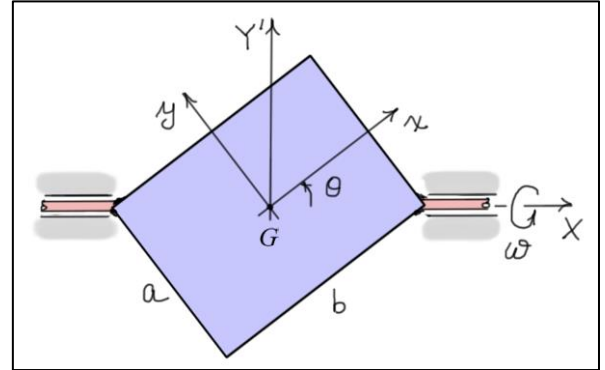


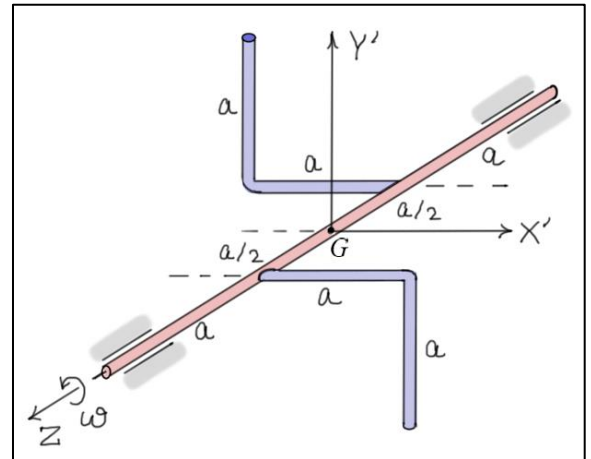
Intermediate Dynamics

Exercises #6

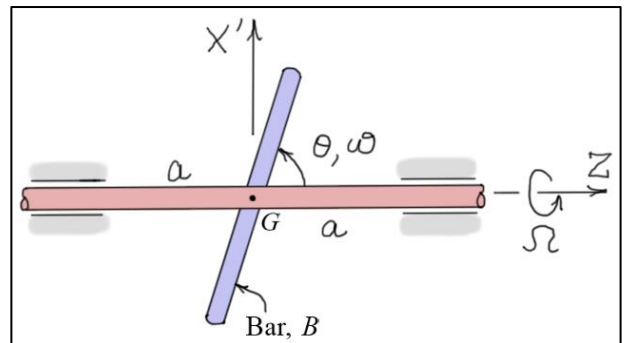
- 1) The rectangular plate P is welded to a shaft, so it rotates about its diagonal. (a) Find \underline{H}_G the angular momentum of P about its mass-center G . Express the results in the X , Y' , and Z' shaft-fixed directions. (b) Find K the kinetic energy of the plate.



- 2) The system shown consists of two L-shaped arms welded to a shaft of length $3a$. The planes of the arms are at right-angles to the shaft. Complete the following assuming all parts are made of "slender" bars. (a) Find \underline{H}_G the angular momentum of the system about its mass center G . Express the results in the X' , Y' , and Z shaft-fixed directions. (b) Find K the kinetic energy of the system.



- 3) The system shown consists of a bar B that is pinned through the center of a shaft of length $2a$. As the shaft rotates about the Z -axis at a rate Ω (r/s), B rotates about the Y -axis (normal to the plane of the diagram) at a rate $\dot{\theta} = \omega$ (rad/s). (a) Find \underline{H}_G the angular momentum of B about its mass center G . Express the results in the X' , Y' , and Z shaft-fixed directions. (b) Find K the kinetic energy of B .



- 4) The system shown consists of a bar B that is pinned to the bottom of a disk D . As the disk rotates at a rate Ω (rad/sec) about the Z -axis, the bar rotates at a rate $\dot{\theta}$ (rad/sec) about the X' direction (normal to the plane of the diagram). (a) Find \underline{H}_G the angular momentum of B about its mass-center G . Express the results in the X' , Y' , and Z disk-fixed directions. (b) Find K the kinetic energy of B .

