

Instructions: *On all five assignments this term, there will be 4-5 problems — three of which will be graded to determine your assignment mark for the term. Marks will be deducted for assignment problems not attempted. Be neat and organized in your solutions, and be sure to include units, directions, and 3 significant figures in your final answer.*

1. Problem 6.3 from Ginsberg's text (p.298). Simplify your final answer(s) as far as possible.
2. Problem 6-15 from Ginsberg's text (p.301). Use β as an independent generalized coordinate, and a horizontal X -axis such that $\hat{i} = \hat{e}_{C/A}$. Simplify your final answer(s) as far as possible.
3. Problem 6-35 from Ginsberg's text (p.306). Assume that the shaft is massless. Identify any ignorable coordinates and calculate the corresponding generalized momentum. Let the fixed vertical axis be Y , and let the moving axis x be parallel to the shaft. Simplify your final answer(s) as far as possible.
4. **(Optional)** Problem 6.31 from Ginsberg's text (p.305), solving simultaneously for the servomotor torque Γ . Let the fixed vertical axis be Z , and let a moving axis parallel to the longitudinal axis of the cylinder be y (i.e. $I_{xx} = I_{zz}$). Simplify your final answer(s) as far as possible.
5. Problem 7-19 from Ginsberg's text (p.383). Let the vertical axis be y , and assume that the radii of the spheres are negligible. Simplify your final answer(s) as far as possible. Note that you do not need to use Routh's method to solve this problem.