For the satellite attitude control problem: description

[(a)] Start with the linearized equations for the satellite attitude problem and use the Laplace transform to convert the equations of motion to the s-domain.

[(b)] Find the full transfer matrix from the input $\tau(s)$ to the outputs $\Phi(s)$ and $\Theta(s)$.

[(c)] Find the transfer matrix, find the second-order transfer function from $\Theta(s)$ to $\Phi(s)$.

[(d)] Under the assumption that the panel moment of inertia J_p is significantly smaller than the spacecraft moment of inertia J_s (specifically, $(J_s+J_p)/J_s \approx 1$), find the second-order approximation for the transfer function from $\tau(s)$ to $\Theta(s)$.

[(e)] From (c) and (d) form the approximate transfer function cascade for the satellite/panel system and justify why it makes sense physically.