

HW 2.1 Weekly Reflection

Looking back on the modules for Forces Due to Static Fluids, I realized the fundamental role that forces due to static fluids play in understanding fluid behavior. I learned that these forces are intrinsically connected to the pressure exerted by the fluid. I also improved my skills in constructing and interpreting free body diagrams, as well as identifying and calculating resultant forces. One of the problems I reviewed introduced the concept of assuming a fictional fluid above a surface of interest when the fluid in question is below this surface, which was a practical approach I learned.

In regards to buoyancy and stability, I came to understand that the center of buoyancy is essentially the centroid of the displaced volume of a body in a fluid. The conditions for stability became clearer: for submerged bodies to be stable, their center of gravity must lie below the center of buoyancy. On the other hand, for floating bodies, stability is ensured when the center of gravity is below the metacenter, with the metacenter being a function of the second moment of area and the displaced volume, $MB = I/V_d$.