



Achieving Neutral Buoyancy in Underwater Robotics

In our aquatic robotics project, we meticulously controlled buoyancy using the neutral buoyancy method. This involves precisely adjusting the robot's mass until its overall density matches that of water. Our process involved a combination of theoretical calculations and practical experimentation.

We leveraged **SolidWorks for accurate volume determination** and cross-referenced this with **ChatGPT for predictive mass estimations** required to achieve neutral buoyancy. This dual approach provided a strong foundation for our weight distribution strategy.

The iterative **trial-and-error process** was crucial. We incrementally added weights, starting with **six 500g weights** and then **two 1kg weights**, refining the robot's submergence. The final adjusted total weight for neutral buoyancy was approximately **11.25 kg**.

Volume Calculation

Initial volume determined via SolidWorks and validated through AI-assisted computations for mass prediction.

Iterative Weighting

Deployment of 500g and 1kg weights in a trial-and-error approach to fine-tune buoyancy.

Target Buoyancy Achieved

Successful neutral buoyancy attained at a cumulative mass of 11.25 kg, ensuring stable underwater operation.