

Heave Motion Control of an Autonomous Underwater Vehicle having Four Ballast Tanks

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Abstract—Autonomous Underwater Vehicles (AUVs) have a wide range of applications especially in underwater survey and defense operations along with industrial and military use. Heave motion has been a significant aspect of AUV dynamics and control of heave motion has been a topic of research for long. In most of the cases, a traditional submarine design is used to perform the motion analysis. Here, an underwater vehicle equipped with four ballast tanks at four bottom corners has been used and a closed loop model free controller has been developed to control the heave motion. PI and PID controller performances have been compared for different heave displacement signals with varying frequencies. The simulation results revealed excellent tracking throughout the cycle for sinusoidal and triangular displacements upto a frequency of 0.02 Hz.