

Chapter 3 : ConceptDesign

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The concept developed here is a two-body system in which a floating surface buoy is driven by the waves and reacts against a submerged plate. Energy is extracted by a power take-off device located between the surface buoy and submerged plate. The system has been deployed in both a drifting mode and also anchored to the seafloor.

1 Linear Analysis of System Heave Motions

Although there are several non-linear forces behaviors in the system, it is still useful to perform a fully linearized analysis of the system to determine estimates of the expected behavior. Full linearization allows the analysis to be performed in the frequency domain and the effects of varying a wide range of system parameters can be quickly evaluated. For this analysis the system shown in figure 1 is analyzed through the use of linear wave-theory, linear power take-off behaviors and linearization of viscous drag effects. The size and weight parameters are shown in figure 2

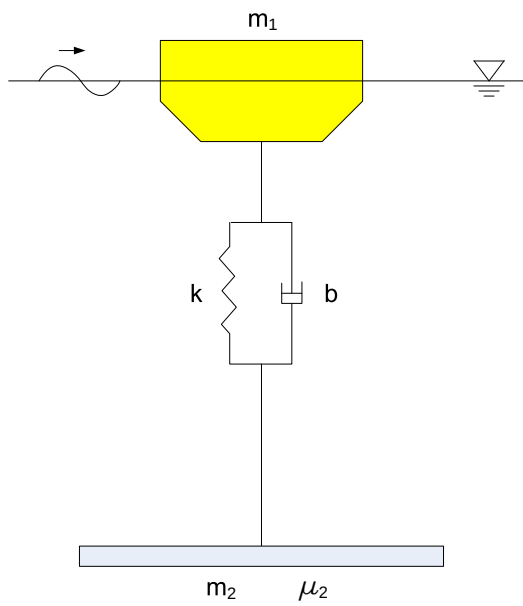


Figure 1: Schematic of wave-energy converter for linear analysis. The power take-off device is represented by a linear spring-damper system with spring constant k and damping coefficient b .

Buoy

$$d = 2.5m$$

$$\nabla = 3.0m^3$$

Submerged Plate

$$d = 2.5m$$

Figure 2: Size parameters for system