

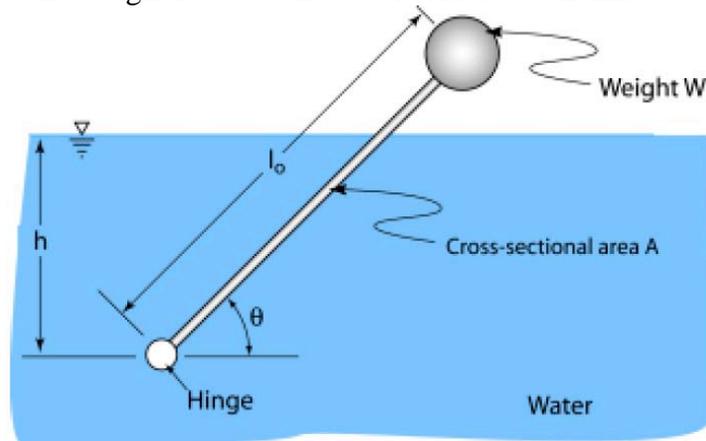
MASSACHUSETTS INSTITUTE OF TECHNOLOGY
DEPARTMENT OF MECHANICAL ENGINEERING
2.06 Fluid Dynamics

RECITATION #2, Spring Term 2013

Topics: Hydrostatics Examples

Problem 1

A spar of density ρ_0 , length l_0 and constant cross-sectional area A is hinged at one end to a fixed position under water. A concentrated weight is fixed to the end opposite the hinge as shown. The water level is at a distance h above the hinge. The spar comes to rest at an angle θ . The water density is ρ . Please derive an expression for the angle θ in terms of ρ , ρ_0 , l_0 , h , W , A and g . Please assume that the cross-sectional area is small so that $\sqrt{A} \ll h$ and that the weight is above the water surface at all times.



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