1. Vallis (2019) Problem 3.2


7. Cushman-Roisin (1994) Problem 3-1

3-1. A laboratory tank consists of a cylindrical container 30 cm in diameter, filled at rest by 20 cm of fresh water and then spun at 30 rpm. After a state of solid-body rotation is achieved, what is the difference in water level between the rim and the center? How does this difference compare with the minimum depth at the center?


3-3. Using the scale given in (3-34), compare the dynamic pressure induced by the Gulf Stream (speed = 1 m/s, width = 40 km, and depth = 500 m) with the main hydrostatic pressure due to the weight of the same water depth. Also, convert the dynamic-pressure scale to its equivalent height of hydrostatic pressure (head). What can you infer about the possibility of measuring oceanic dynamic pressures by a pressure gauge?
9  Cushman-Roisin and Beckers (2011) Problem 3-5

3-5. Within the Boussinesq approximation and for negligible diffusion in (3.24), show that for an ocean at rest, density can only be a function of depth: \( \rho = \rho(z) \). (Hint: The situation at rest is characterized by the absence of movement and temporal variations.)

References

