PHY 711 – Problem Set # 22

Continue reading Chapter 10 in *Fetter and Walecka*.

1. In class, we showed that the velocity potential for a wave traveling in water corresponding to the surface function

\[ \zeta(x,t) = \zeta_0 \sin[k(x - ct)], \]

is given by

\[ \Phi(x,z,t) = \frac{\zeta_0 c}{\sinh(kh)} \cosh(kz) \cos[k(x - ct)]. \]

In these expressions, \( c \) represents the speed of the wave and obeys Eq. 54.32. Check whether this form of \( \Phi(x,z,t) \) is consistent with Eq. 54.36 of your text.