

Problems Week 6

1. *Poles of the transmission coefficient.*

(i) Use the identity

$$W(\psi_-, \psi_+) = 2ika^{-1}$$

to prove that a^{-1} has zeros at $k = i\kappa_n$.

(ii) Use the derivative of this identity with respect to k , i.e.

$$W\left(\frac{d}{dk}\psi_-, \psi_+\right) + W\left(\psi_-, \frac{d}{dk}\psi_+\right) = 2ia^{-1} - 2ikd'a^{-2}$$

to show that $a(k)$ has simple poles at $k = i\kappa_n$.