Q1:

(1) free surface: zero stress in all directions along the surface.

(2) solid-solid interface: continuity of all components of displacement and stress across the interface.

(3) solid-liquid interface: continuity of the vertical displacement and vertical stress across the interface, zero shearing stress.

Q2:

Model: ***CRUST1.0*** from Gabi Laske, Zhitu Ma, Guy Masters and Michael Pasyanos (LLNL)

Location: Nanjing (32.04N 118.78E), 10.31km depth in the crust

```
ilat,ilon,crustal type:    58 299
 topography:     3.99999991E-02
  layers: vp,vs,rho,bottom
   1.50    0.00    1.02    0.04
   3.81    1.94    0.92    0.04
   2.50    1.07    2.11   -0.26
   0.00    0.00    0.00   -0.26
   0.00    0.00    0.00   -0.26
   6.10    3.55    2.74  -10.57
   6.30    3.65    2.78  -20.89
   6.60    3.60    2.86  -31.51
 pn,sn,rho-mantle:     7.92    4.41    3.27
```

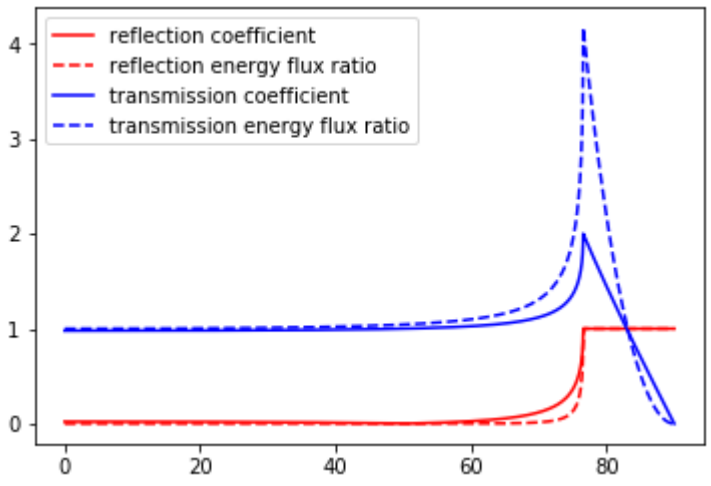
Formula:

$$\overset{\backslash}{S}\overset{/}{S} = \overset{/}{A}_1 = \frac{\rho_1\beta_1\cos\theta_1 - \rho_2\beta_2\cos\theta_2}{\rho_1\beta_1\cos\theta_1 + \rho_2\beta_2\cos\theta_2}$$

$$\overset{\backslash}{S}\overset{\backslash}{S} = \overset{\backslash}{A}_2 = \frac{2\rho_1\beta_1\cos\theta_1}{\rho_1\beta_1\cos\theta_1 + \rho_2\beta_2\cos\theta_2}$$

Code: see ***hw1.py***

Sketch:



Incident Angle(°)