

ECE/TAM 473
 Homework Assignment #5
 Due: Friday, October 12, 2018

1. Two plane waves interact such that $p(x,t) = A \cos(\omega t - kx) + A \cos(\omega t + kx)$. Determine the instantaneous intensity and the average intensity.
2. Kinsler et al. 5.11.2
3. Kinsler et al. 5.11.3
4. Kinsler et al. 5.11.5
5. Calculate the missing values for a spherical outgoing wave propagating in the two **liquids**.

distance from source (m)	0.1	0.1
frequency (kHz)	5	500
angular frequency (kr/s)		
propagation speed (m/s)	1500	1500
ambient temperature (°C)	20	20
wavenumber (1/m)		
wavelength (m)		
equilibrium density (kg/m ³)	1000	1000
ratio of specific heats (γ)	1.01	1.01
equilibrium pressure (kPa)	100	100
isothermal bulk modulus (GPa)		
adiabatic bulk modulus (GPa)		
peak particle displacement amplitude (μm)		
peak particle velocity amplitude (mm/s)		
peak particle acceleration amplitude (m/s ²)		
peak condensation amplitude ($\times 10^{-6}$)		
peak acoustic pressure amplitude (kPa)		
peak excess density amplitude (g/m ³)		
SPL (re: 1 $\mu\text{Pa}_{\text{rms}}$)		
characteristic acoustic impedance (Mrayl)		
average potential energy density (mJ/m ³)		
average kinetic energy density (mJ/m ³)		
average energy density (mJ/m ³)		
average acoustic intensity (W/m ²)		
total power of source (kW)	1.0	1.0