BME 200
HW6

Follow the homework guidelines on the course webpage to answer the following.

1. A tissue is 20 cm total width, consisting of 4 cm of bone and 16 cm of muscle. With an incident x-ray energy of 70 keV, the HVL values for muscle and bone are 3.5 and 1.8 cm, respectively. What percentage of x-rays are transmitted through the tissue?

2. In doppler ultrasound, given a speed of sound of 1540 m/s and a measured flow velocity of 50 cm/s, what angle to the flow would give a change in frequency (between f_i and f_d) of 0.03%?

3. What are the wavelengths for the radiation used in FM radio transmission, which spans the frequency range of 88–108 MHz? What is the range of energy carried by this range of frequencies?

4. Design an image processing filter that can sharpen an image. Look at the image processing kernel page on Wikipedia for some ideas. Prove that it works by calculating a new value for the blue number shown below.

100	200	100	200	
200	100	200	100	
100	200	100	200	