Assignment 4

Due: December 2, 2014

I. Explain how anisotropy leads to splitting of shear waves?

II. Explain why Fermat's principle is important for conventional refraction seismology? (the conventional refraction seismology means what you learned in the class.)

III. Figure 1 shows travel times of direct and refracted waves. The model contains two horizontal layers on top of the half space. Answer the questions below.

1) Estimate the layer thicknesses of the first and second layers.

2) Estimate the velocities of each layer (first and second layers, and half space).

3) Compute the travel times of reflected waves from the second layer and the half space. (*hint*: you can use the rms velocity for the reflected waves from the half space. Also, you do not need to consider multiples.)

IV. Assume that a 24-fold seismic survey records data sampled every 40 milliseconds, and that each trace is 10 s long. For a source spacing of 25 m, how many data points are recorded in a 100 km-long 2D survey? (problem 11 on p.213)

V. Explain what the migration is for reflection seismology. Why is it important?

VI. When a large earthquake occurs at California, can people at California observe 1) direct P waves, 2) PP, 3) PcP, 4) ScS, 5) SKS, 6) $SKiKS$, 7)$P'P'$?

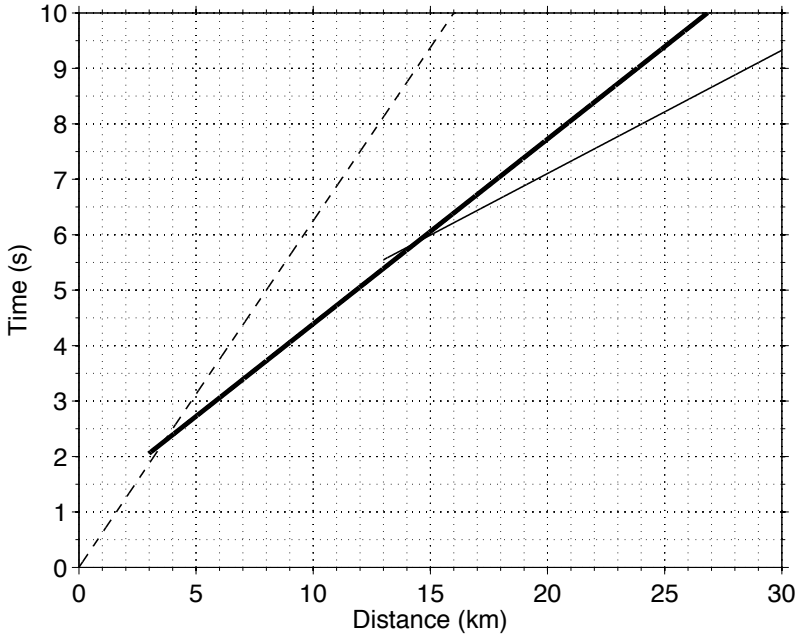

Figure 1: Travel times of direct and head waves obtained from the two-layer model.