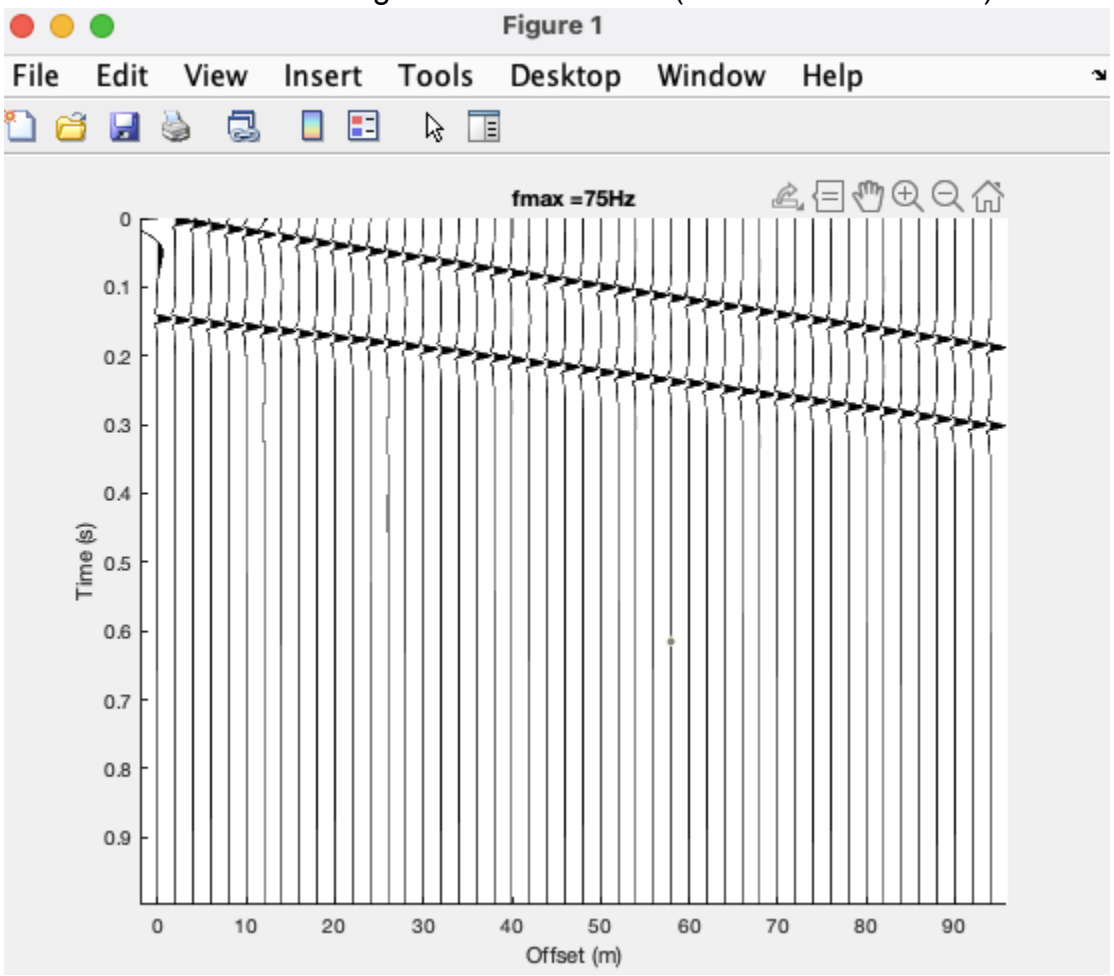
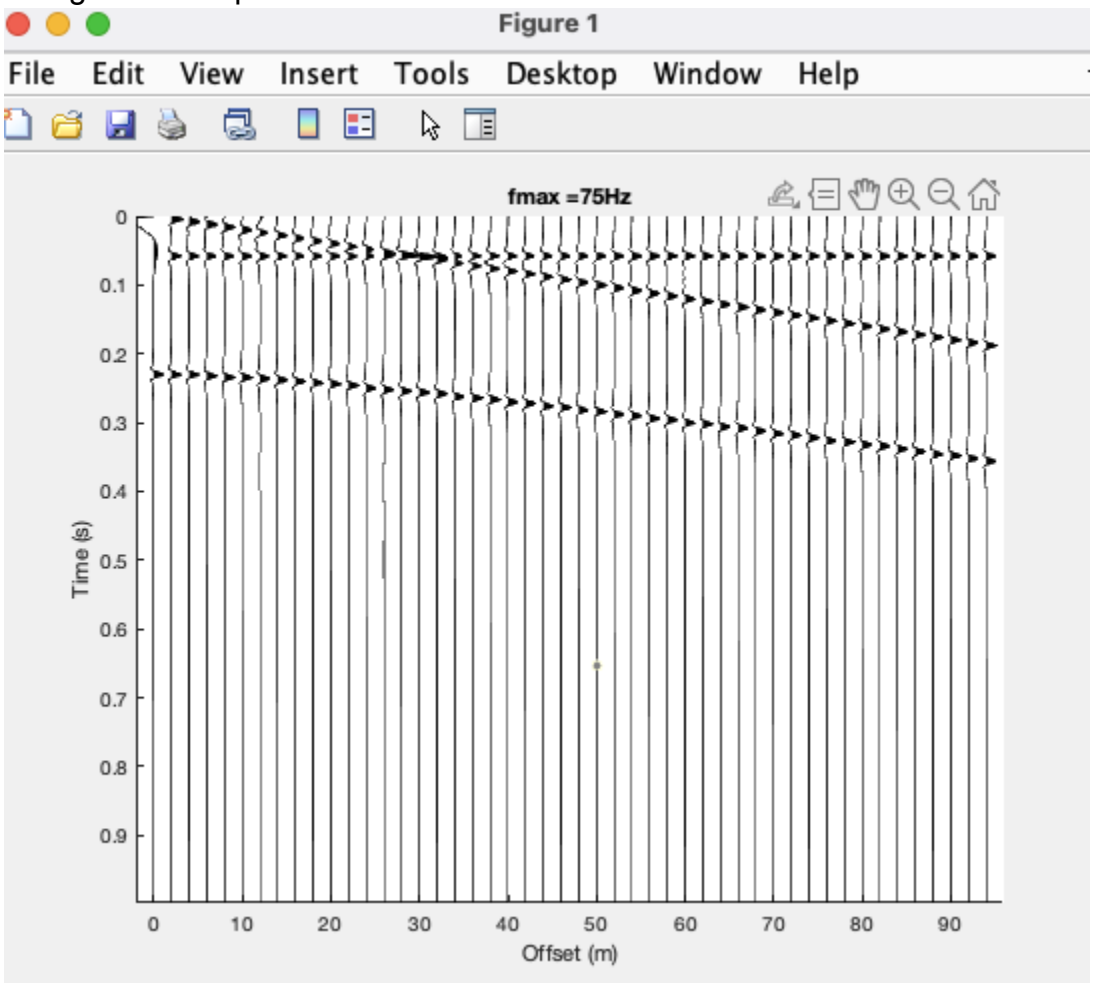
Tyler Yamori-Little
Question 1:

a)
Hand in the modeled shot gather for this arrival (sort of a direct arrival).



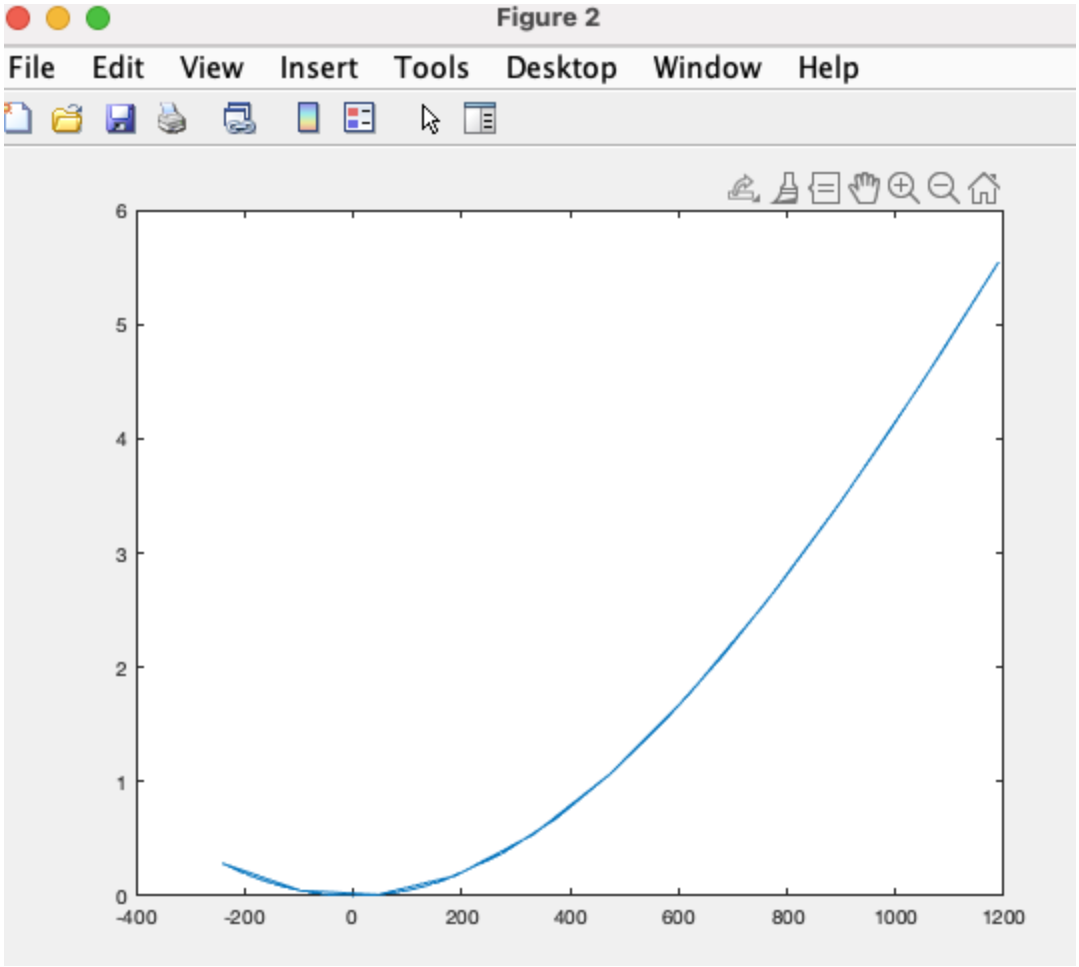
This data was found after filtering the time to include data points between 0 and 500ms. The equations given resulted in complex numbers. Also, The HW3 code was modified to have V2 represented as an array of gradient values. Without the filter the following

shot gather was produced:



b)
hand in a plot of the raypaths for the arrival—e.g. raypath
j(x,z) where j is the source/receiver offset. You will need to sample the (x,z) plane finely (say dx=dz = .1 m) to create a smooth looking raypath.

The raypath was calculated by interpolating the data and then backsolving for z and x from the time array.



c)
How does changing the velocity gradient affect the maximum depth of the ray

for a particular offset and takeoff angle?

Increasing the velocity gradient decreases the depth of the raypaths.

Question 2:

Suppose at z=20m you hit basement (V=3000 m/s).

a)
Modify your modeling code to compute t(x) for the refracted arrival as well as the

reflected arrival from the top of basement. Note that for the refracted arrival, there

is only one takeoff angle that is defined by the critical angle, but for the

Reflected arrival you can compute the 1-way time as: hm = 20

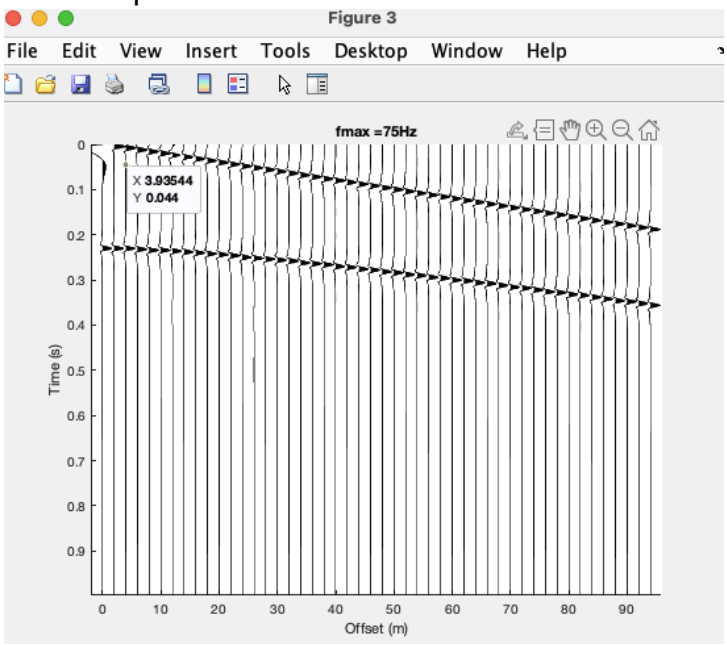
See code… basement replaced any gradient values greater than 1500m/s because 500 + 50z is the gradient. Therefore, 500 + 50(20) = 1500.

b)
Add the reflected and refracted arrivals to the ‘sort of’ direct arrival you created in

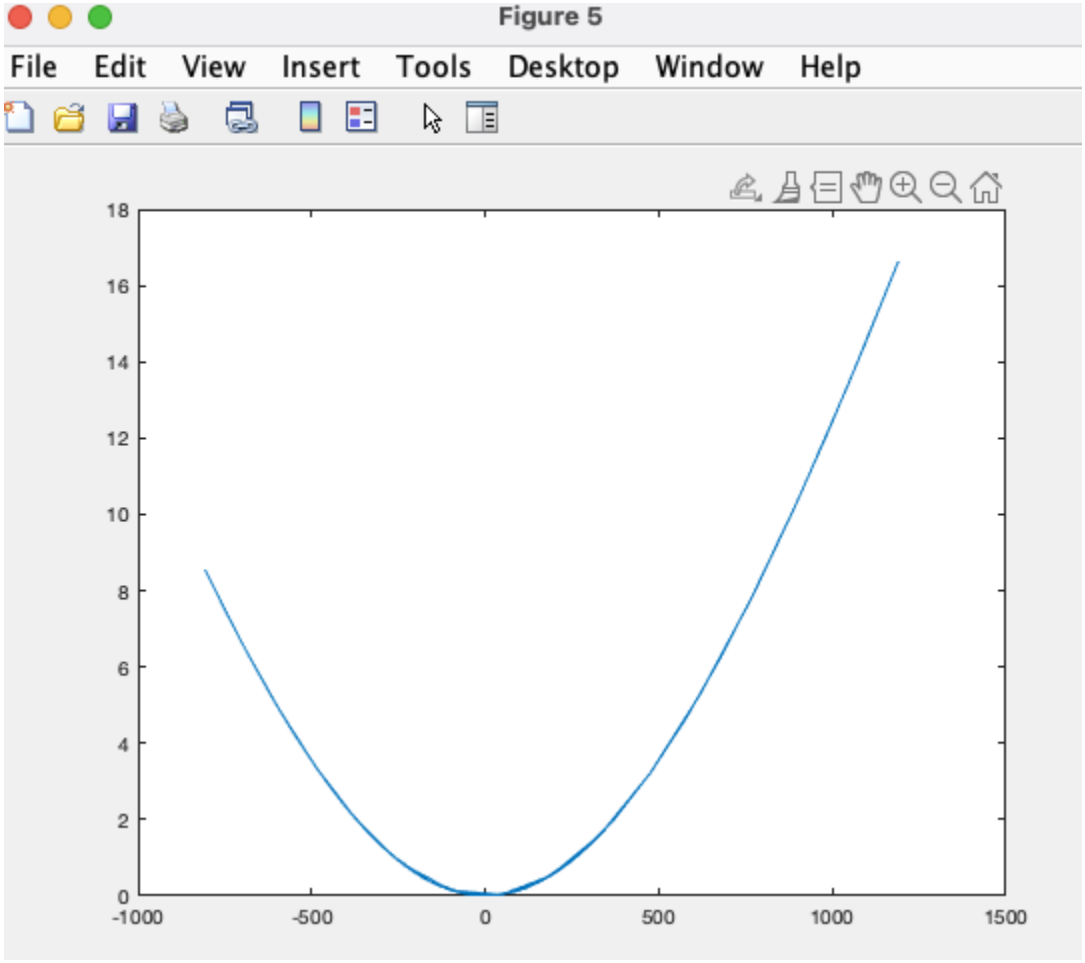
1a, and hand in a new shot gather. Remember the ‘sort’ of’ direct arrival cannot

penetrate more than 20 m.

I don't know if this raypath my code produced is "new" because its similar to the unfiltered data found in question 1.



c)
hand in a plot of the raypaths for each of the arrivals.



Same methodology was used as question 1.