

E2 : Travel time curves for GPR

E2.1 Half-space with variable TX-RX offset

- Air wave
- Ground wave

E2.2 Single interface with variable TX-RX offset

E2.2.1 Forward problem

- Air wave,
- Ground wave,
- Reflection, normal moveout
- Example from Figures 8.16 and 8.17 from Burger et al.,

E2.2.2. Inverse problem

- (a) With a single zero offset trace we only have a measure of the travel time at normal incidence (t_0). Unfortunately with just once data point, we cannot determine 2 variables (d_1 and v_1).
 - (b) Plot a graph of NMO as a function of x^2 and from slope can determine v_1
Only valid when $x < d$
 - (c) Plot a graph of x^2-t^2 . From the slope can determine v_1
- Figure 8.20

E2.3 Single interface with constant TX-RX offset profiling

- Air wave,
- Ground wave
- Reflection
- Since $t = d/v$ we cannot resolve d and v with this approach

E2.4 Diffraction with constant TX-RX offset profiling

- Air wave,
- Ground wave
- Reflection
- Example from Figures 8.19

E2.5 Variable depth with constant offset profiling

- As basement shallows, the travel time decreases
- Diffraction from corners
- Note that the reflection does not occur directly below the TX-RX. Can cause some distortion of the geometry. Process called migration used to remove this effect.