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**Abstract** – Quick summary. Indicates problem, method and conclusion

**Chapter 1 - Introduction**

* Problem: The amplitude of P-Sv synthetics approaches zero at zero offset
* Problem: Finding a reliable way to correlate reflections in P-S seismic
* Talk about multicomponent seismic data
* Method: Using finite-difference and ray tracing methods, simulating a CMP gather
* History of synthetic seismograms, ray tracing and finite difference methods

**Chapter 2 – Method**

Part 1: Finite-Difference

* Go into detail about the finite difference modelling
* Talk about how FD works
* FD edge effects
* Go into details about processing corrections made
* Talk about synthetic seismograms
* Using the same wavelet for P and S waves

**Figures:**

1. Input earth model
2. Finite difference wave propagation
3. Resulting gather
4. Reformatted gather
5. Gain correction
6. NMO correction
7. Stacking
8. Synthetic seismogram
9. Plot of midpoints

Part 2: Ray-Tracing

* Go into detail about how ray tracing works
* Snell’s law and other formulas
* Talk about the Zoeppritz equations and how they found amplitudes
* Phase check
* Talk about the synthetic seismogram and convolutional model

**Figures:**

1. Input earth model
2. Layered earth model
3. Pictures of rays travelling through the earth model
4. Resulting RC log
5. Wavelet
6. Synthetic Seismogram
7. Plot of midpoints

**Chapter 3: Results**

* A case study with real data
* Real well log and seismic
* P-P and P-Sv comparisons
* How many layers should the model have (ray tracing)?
* What degree increment should the model have (ray tracing)?
* FD model parameters
* Comparison between FD and Ray Tracing methods
* Possibly including stretching and squeezing ability

**Figures:**

1. Input earth model
2. Finite difference output gathers
3. FD reformat and gain correction
4. FD NMO correction
5. FD stacking and synthetic seismogram
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7. FD P-P seismogram overlay with seismic with well tops
8. FD P-S seismogram overlain with seismic with well tops
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11. RT rays through the earth
12. RT RC log
13. RT synthetic
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15. RT P-P synthetic overlay with seismic with well tops
16. RT P-S synthetic overlay with seismic with well tops
17. RT plot of midpoints

**Chapter 4: Collusion**

* Talk about future work
  + Add anisotropy
  + RT accounting for multiples
  + Possibly stretch and squeeze ability
* Conclude the results from the work
* Talk about which method is better in certain situations
* Talk about the negatives of each method

**References**

**Appendix**