Talk Outline

1. **Introduction**
   1. Define tsunami wave (versus wind wave)
      1. Typical causes of tsunami waves
      2. Include pictures/videos – from trip and elsewhere
   2. Purpose of our research
2. **Previous Work**
   1. *Problem setup picture(s) (which shows all variables)*
   2. *Assumptions*
   3. *NLSWEs – derived from conservation of mass and Newton’s Second Law under assumptions (Just mention, not actually derive)*
      1. Mention that the SWEs have no dispersion – there is very little dispersion near shore so this is where SWEs apply… fact check and/or more info
   4. *Very brief overview of how NLSWEs are linearized for arbitrary cross section*
      1. *Properties of new system*
      2. *Include equations to get back to physical variables*
      3. Analytical F(σ) and thus W(σ) for |y|^m case
3. **Our work**
   1. *Discuss our specific problem which allows us to apply spectral methods*
      1. Boundary condition: shore condition and “wall” at some distance L
         1. This is a potential problem we must keep track of… eta must be close to zero to avoid significant error.
      2. *Mention physical examples where “wall” could exist*
         1. *Actual physical wall-like object: dam, glacier, cliff, steep mountain, anything steep enough that does not move can be approximated as a wall*
         2. *Point that the wave passes through but does not alter height (analogous to point in the middle of 2 standing waves)*
   2. Go through spectral method for arbitrary m with Bessel solution.
   3. *Mention for m=2 this solution is simplified to sin solution*
      1. *Still not fully analytic though because eigenvalues can only be found numerically*
4. **Results**
   1. Various plots with differing initial waves and bays – *including top-down view*
      1. Plots of same initial wave through different bays
         1. Discuss resonance in terms of max. run up vs. max run up in plane-shaped bay (very large m)
            1. *Also in terms of how far up shore wave travels (top-down view)*
      2. Include at least one plot of eigenfunctions in both physical and sigma space
      3. Include error in x wall mentioned previously in all different plots
   2. Comparison to Pelinovsky’s analytic solution for m=2 and initial profile from paper
      1. *Comparison to initial condition*
      2. *Alter number of eigenvalues*, sigma (or x) steps, and lambda steps (each separately) to see what it takes to converge to analytic solution.
   3. Possibly use max. run up and min. run down as a convergence metric - when varying number of eigenvalues, sigma (or x) steps, and lambda steps - for other values of m
   4. Show how closely nonlinear system follows superposition principle – measure of how linear/nonlinear the system is
5. **Conclusion**
   1. Discuss strengths and weaknesses within model.
   2. *Future improvements/future work.*
   3. *Acknowledgements*
   4. *Bibliography*