

Catalina 1 Analytic vs. Numerical Solution

June 16, 2020

1 Problem

Compute the analytic and numerical solutions of the following shallow water problem:

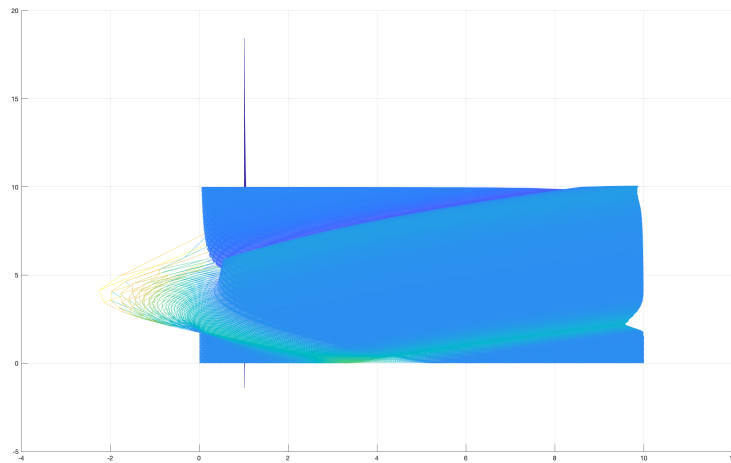
$$\begin{aligned}\eta &= e^{-(x-5)^2} \\ u &= 0 \\ h &= x \\ m &= \infty\end{aligned}$$

In other words, a Gaussian initial wave with 0 initial velocity, and a plane.

2 Setup

2.1 Numerical

We modified Deny's Catalina 1 finite volume to build



2.2 Analytic

We used Chebfun to calculate the Hankel transform solution to the SWE. We

3 Statistical Analysis

We used an L2 norm

4 Further Problems

Comparison of the computation of U