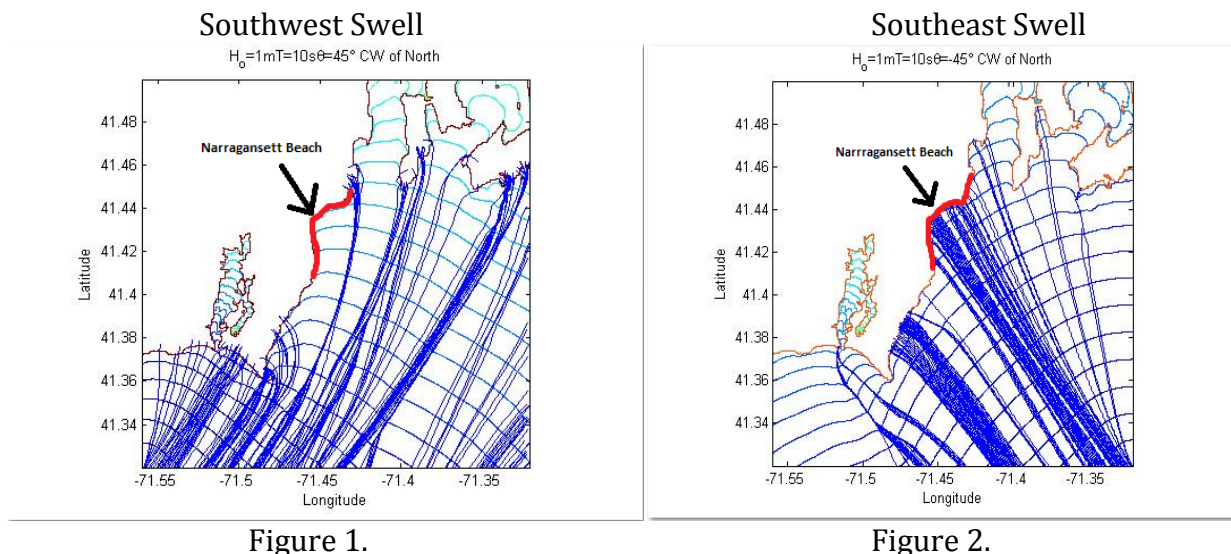


Waveray.m

The script waveray.m computes wave rays for Narragansett Bay using Eikonal's equation. In order to run the waveray.m you must first download the toolbox *Path of Fast Marching Library* (1) as well as the bathymetry NetCDF file (2). It is important that the bathymetry file and Path of Fast Marching Library toolbox are located in the same directory as the waveray.m script. Lastly, the script compile_c_files.m must be executed prior to waveray.m.

Many parameters can be altered to fit the desired wave ray field. The ang variable refers to the initial deepwater waveray oriented at an angle clockwise from North. For instance, if you have an incoming SW swell, the angle orientation would be ang=45 degrees (See figure 1).



As you can see varying the incident wave direction drastically alters the wave ray patterns for Narragansett Beach.

Waveray.m can be computationally long to run, depending on certain constraints i.e. resolution, number of wave rays... When you first start out using the script, you should use coarse constraints. For example a resolution of 20-30m and fewer wave ray contours (use larger intervals 20-40 in line 88 with flon and flat). Once you are ready to solve your problem then you may increase your resolution and number of wave rays to obtain more accurate results. Below are some examples of varying constraints.

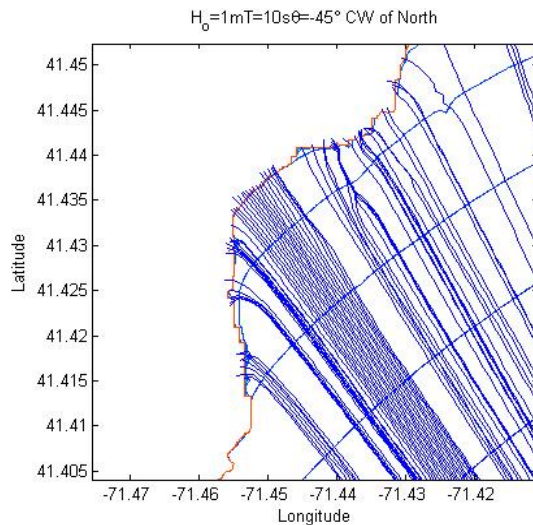


Figure 3

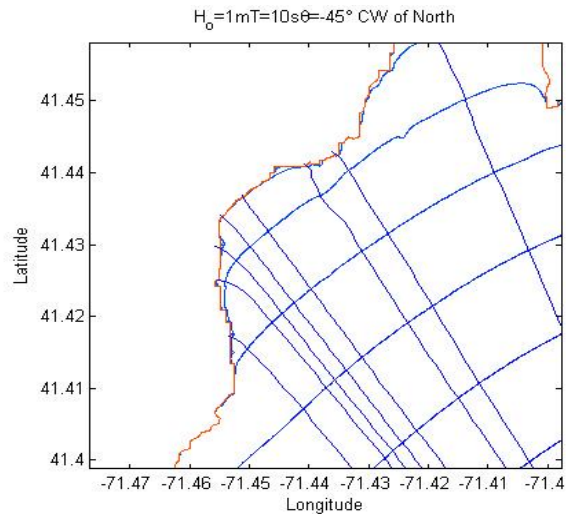


Figure 4

Figure 3 and 4 take closer looks at wave ray patterns for Narragansett beach, when exposed to a Southwest swell. Figure 3 uses a resolution of 10m and interval of 2 for the flon, flat in the streamline command (line 88). Figure 4 uses a 20m resolution with interval of 20 for flon,flat of the streamline command. The computational difference was approx. 30s and 5 min. for figure 4 and 3 respectively.

As outlined in the project description you must modify waveray.m in order to calculate the breaker line.

- 1.) <http://www.mathworks.com/matlabcentral/fileexchange/24531-accurate-fast-marching>
- 2.) <http://www.ngdc.noaa.gov/mgg/coastal/grddas01/grddas01.htm>