Homework 5

1. The subtropical gyre

1) (40pts) Plot the spatial pattern of the streamfunction for the subtropical-gyre circulation based on the mathematical expression we derived in class (Hint: use the command “contour” or “contourf” in Matlab or Python to make this plot).

The labels and ticks for the x-axis and y-axis need to be provided. If you plot contour lines (“contour”), the numerical values need to labeled on the lines. If you use color shading (“contourf” or “shading interp”), a colorbar with ticks needs to be provided.

2) (40 pts) Superimpose the currents (vectors) on the streamfunction plot you made (you need to derive the zonal and meridional current velocity from the streamfunction first).

3) (20 pts) The subtropical gyre plays an important role in the dispersion of pollutants in the North Pacific Ocean (like the Fukushima’s nuclear wastwater). You can search the numerical simulations for the Fukushima’s wastewater, and write a small paragraph discussing the impacts of the wastewater dispersion on the marine environments of the North Pacific Ocean and the marginal seas.