

## Tropical Meteorology

### Problem Set 4

1. Referring to the Notes on the Gill Model (see class web page), develop analytic solutions to (12) for the steady response of the tropical atmosphere to a (nondimensional) sea surface saturation entropy distribution of the form

$$s_0^* = e^{-by^2} \cos(kx),$$

*neglecting the effect of fluctuating winds on the surface enthalpy flux.* Graph the solutions for  $s$ ,  $u$ ,  $v$  and  $w$  for the case  $b=1.5$ ,  $\chi=1.5$ , and  $k=1$ .

2. Download the files *gill.f*, *gill\_params.txt* and *gill.m* from the class web page, into a single directory. Compile the FORTRAN code *gill.f*. The program reads parameters from the first column of the file *gill\_params.txt*. Run the program for the case  $b=1.5$ ,  $\chi=1.5$ ,  $\alpha=-1$ , and  $k=1$ . You can graph the solutions on MATLAB using the script *gill.m*. Compare the solutions to those you found in the no-WISHE case in Problem 1. Explain the differences.