Session 8

1. If the surface height perturbation in a shallow water gravity wave is given by

$$h' = Re\left[Ae^{ik(x-ct)}\right]$$

find the corresponding velocity perturbation $u'(x,t)$. Sketch the phase relationship between h' and u' for an eastward propagating wave.

2. Linearize the rotating shallow water equations. Obtain the dispersion relation for the plane wave solution. Discuss the results using the short and long wave limit.

3. Linearize the two-layer non-rotating shallow water equations. Assume two-dimensional flow and no bottom topography.