**MR3252: Tropical Meteorology**

Note-Taking Questions for Lecture Series 5

1. What is the difference between a dispersive and non-dispersive wave?
2. What is the difference between inertia waves and gravity waves? What are examples of each in the Matsuno-Gill solutions (i.e., equatorial inertial waves and equatorial gravity waves)?
3. What is a Hovmöller diagram and what is its utility? How is such a diagram interpreted?
4. What is equivalent depth in convectively coupled equatorial wave theory, i.e., what is it used to describe?
5. What is a freely propagating equatorial wave? What is a “convectively coupled” equatorial wave? What does the tilt of such a wave combined with its propagation direction and phase speed tell us about the effect of the wave on the transition of convection from shallow to deep?
6. Why is the MJO circulation response considered to be a hybrid of equatorial Kelvin and Rossby waves?
7. How are various indices (e.g., RMM, OMI, VPM) used to “track” the upward branch of the MJO circulation?
8. Why do the Matsuno-Gill solutions not capture subseasonal variability like the MJO that appears so prominently on observationally derived wavenumber-frequency power spectra of tropical outgoing longwave radiation?
9. What component of the dispersion relation for any equatorial wave describes its propagation? What component describes its growth or decay? Be able to argue this mathematically.
10. Why is it so essential to MJO growth (i.e., growth of the moisture wave) that cumulus clouds transport moisture into the middle and upper troposphere? What is the effect on large-scale effective gross moist stability of cumuli moistening the troposphere?