Homework Assignment #8

(due: Friday, November 2, 11:30 pm)

1. Tides: Taylor problem (9.5)
Hint: There is no need for you to hand in notes about your review of $U_{\text{tid}}(Q)$. For the derivation of $U_{\text{tid}}(P)$ use the binomial series $(1 + z)^n = 1 + nz + \frac{n(n-1)}{2!}z^2 + \ldots$. Keep terms up to second order in z.   (7P)

2. Azimuthal Force: Taylor problem (9.10)   (6P)

3. Lense Production: Taylor problem (9.14)   (7P)
Schott (the German equivalent to the glass company Corning) has used this feature to produce a lense with a diameter of 8m. They spun liquid glass while it was cooling down.

4. Frictionless Puck:

4a. Taylor problem (9.20)
Clarification of Hint: For (9.20b) use as second solution $\eta(t) = te^{-i\Omega t}$ and check that this $\eta(t)$ indeed is a solution to the DE for $\eta(t)$.   (9P)

4b. Taylor problem (9.24)
Hint: For the interpretation of your plot of d) make also an enlargement for $0.0 \leq x \leq 1.0$ and $-0.35 \leq y \leq 0.0$.   (6P)

5. Free Fall: Taylor problem (9.26)   (7P)

6. Foucault Pendulum: Taylor problem (9.34)   (8P)