

PHYS 401 Homework #5 , Due on 11/12

- 1) Show that the solution of the Laplace equation in cylindrical coordinates when there is no dependence on z is given by

$$\sum_{m=1}^{\infty} \left(A_m s^m + \frac{B_m}{s^m} \right) (C_m \cos(m\phi) + D_m \sin(m\phi))$$

- 2) Griffith problem 4.22 (page 196) hint. Use the result from problem 1 and follow the example 4.7
- 3) Griffith problem 4.26 (page 202)
- 4) Griffith problem 4.36 (page 206)
- 5) A uniformly charged solid sphere of Radius R and total charge Q is spinning at a constant angular velocity ω about the z axis.
- 1) Find the current density at any point (r, θ, ϕ) within the sphere (origin of coordinates is at the center of the sphere).
 - 2) Find the magnetic field at a point on the z axis.
- 6) Griffith problem 5.14 (page 239).