

Problem Set #10

Due Wednesday, November 28, 2007

1. Show that the ordinary differential equation derived in class for the radial solution to the wave equation for a circular drumhead,

$$P''(\rho) + \frac{1}{\rho}P'(\rho) + \left(\frac{\omega^2}{c^2} - \frac{m^2}{\rho^2}\right)P(\rho) = 0$$

reduces to the standard form of the Bessel equation (Eq. 18.74) with the change of variable $z = k\rho$ and with $m^2 = \nu^2$.

2. RHB Problem 21.2

Note: For purposes of this problem and consistency with the hint in the text, assume that the heat flow per unit area is $\vec{H} = -\kappa\vec{\nabla}u$. Actually, κ , the thermal diffusivity, is only proportional to the thermal conductivity k which should appear in the heat flow equation.

3. RHB Problem 21.4

4. RHB Problem 21.11

Additional problem for practice -- **REQUIRED FOR PH561 STUDENTS!**

5. RHB Problem 21.13.