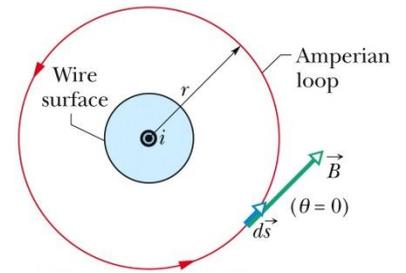


Interactive Problem Set 24, SP212 Spring 2013

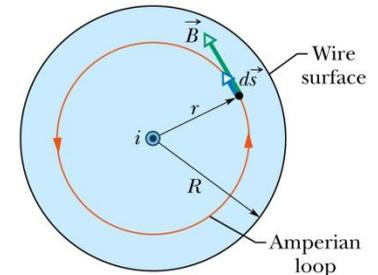
Topic: Ampere's Law and Magnetic Field from a Coil

1. Ampere's Law

- i. Using Ampere's Law find the magnetic field outside a long straight current carrying wire.



- ii. The figure shows a cross section across a diameter of a long cylindrical conductor of radius $R = 2.00$ cm carrying uniform current 170 A. What is the magnitude of the current's magnetic field at radial distance **(a)** 0, **(b)** 1.00 cm, **(c)** 2.00 cm (wire's surface), and **(d)** 4.00 cm



2. A solenoid 1.30 m long and 2.60 cm in diameter carries a current of 18.0 A. The magnetic field inside the solenoid is 23.0 mT. Find the length of the wire forming the solenoid.

3. The figure shows an arrangement known as a Helmholtz coil. It consists of two circular coaxial coils, each of 200 turns and radius $R = 25.0$ cm, separated by a distance $s = R$. The two coils carry equal currents $i = 12.2$ mA in the same direction. Find the magnitude of the net magnetic field at P , midway between the coils.

