Problem 5.12 Two infinitely long, parallel wires are carrying 6-A currents in opposite directions. Determine the magnetic flux density at point P in Fig. P5.12.

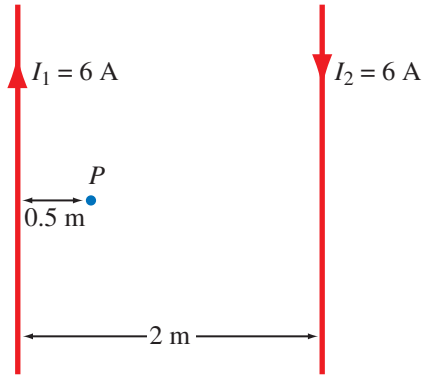

Figure P5.12: Arrangement for Problem 5.12.

Solution:

$$\mathbf{B} = \hat{\boldsymbol{\phi}}\,\frac{\mu_0 I_1}{2\pi(0.5)} + \hat{\boldsymbol{\phi}}\,\frac{\mu_0 I_2}{2\pi(1.5)} = \hat{\boldsymbol{\phi}}\,\frac{\mu_0}{\pi}(6+2) = \hat{\boldsymbol{\phi}}\,\frac{8\mu_0}{\pi} \quad \text{(T)}.$$