

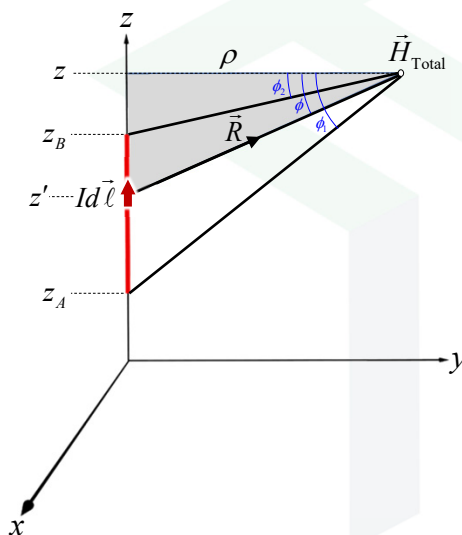


Electromagnetics:
Electromagnetic Field Theory

Example 2 – Magnetic Field Around an Infinite-Length Wire

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Example #2 – Infinite Length Wire



What is the magnetic field \vec{H} ?

For the infinite length wire,

$$\phi_1 = 90^\circ \quad \phi_2 = -90^\circ$$

The expression for \vec{H} reduces to

$$\begin{aligned} \vec{H} &= \frac{I}{4\pi\rho} (\sin\phi_1 - \sin\phi_2) \hat{a}_\phi \\ &= \frac{I}{4\pi\rho} [\sin(90^\circ) - \sin(-90^\circ)] \hat{a}_\phi \\ &= \frac{I}{4\pi\rho} [1 - (-1)] \hat{a}_\phi \end{aligned}$$

$$\vec{H} = \frac{I}{2\pi\rho} \hat{a}_\phi$$

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