What flexibility do we have in defining the vector potential given the Coulomb gauge ($\nabla \cdot \mathbf{A} = 0$)? That is, what can $\mathbf{A}'$ be that gives us the same $\mathbf{B}$?

A. $\mathbf{A}' = \mathbf{A} + C$
B. $\mathbf{A}' = \mathbf{A} + \mathbf{C}$
C. $\mathbf{A}' = \mathbf{A} + \nabla C$
D. $\mathbf{A}' = \mathbf{A} + \nabla \cdot \mathbf{C}$
E. Something else?

What is the physical interpretation of $\oint \mathbf{A} \cdot d\mathbf{l}$?

A. The current density $\mathbf{J}$
B. The magnetic field $\mathbf{B}$
C. The magnetic flux Φ_B
D. It's none of the above, but is something simple and concrete
E. It has no particular physical interpretation at all

For a infinite solenoid of radius R, with current I, and n turns per unit length, which is the current density $\mathbf{J}$?

A. $\mathbf{J} = nI\hat{\phi}$
B. $\mathbf{J} = nI\delta(r - R)\hat{\phi}$
C. $\mathbf{J} = \frac{I}{n}\delta(r - R)\hat{\phi}$
D. $\mathbf{J} = \mu_0 nI\delta(r - R)\hat{\phi}$
E. Something else?!

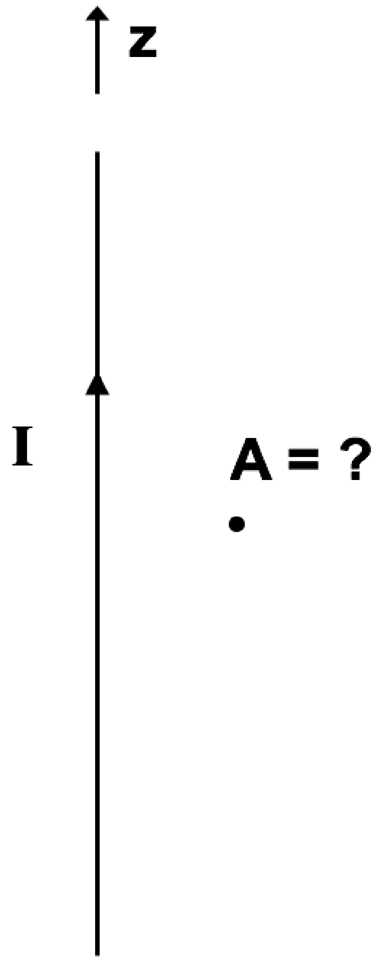
The vector potential A due to a long straight wire with current I along the z-axis is in the direction parallel to:

A. $\hat{z}$

B. $\hat{\phi}$ (azimuthal)

C. $\hat{s}$ (radial)

Assume the Coulomb Gauge



Consider a fat wire with radius a with uniform current I_0 that runs along the $+z$-axis. We can compute the vector potential due to this wire directly. What is $\mathbf{J}$?

A. $I_0/(2\pi)$
B. $I_0/(\pi a^2)$
C. $I_0/(2\pi a)\hat{z}$
D. $I_0/(\pi a^2)\hat{z}$
E. Something else!?

Consider a fat wire with radius a with uniform current I_0 that runs along the $+z$-axis. Given $\mathbf{A}(\mathbf{r}) = \dfrac{\mu_0}{4\pi}\int \dfrac{\mathbf{J}(\mathbf{r}')}{\mathfrak{R}} d\tau'$, which components of $\mathbf{A}$ need to be computed?

A. All of them

B. Just A_x

C. Just A_y

D. Just A_z

E. Some combination

Consider a shell of charge with surface charge σ that is rotating at angular frequency of ω. Which of the expressions below describe the surface current, $\mathbf{K}$, that is observed in the fixed frame.

A. $\sigma\,\vec{\omega}$

B. $\sigma\,\dot{\mathbf{r}}$

C. $\sigma\,\mathbf{r}\times\vec{\omega}$

D. $\sigma\,\vec{\omega}\times\mathbf{r}$

E. Something else?