EE 483/583 Antennas for Wireless Communications (Spring 2026)
Homework 4
Wednesday, February 4, 2026

1) If the vector electric potential for an antenna is $\overline{F} = \hat{a}_x C_0 \dfrac{e^{-jkr}}{r}$, find $\overline{E}$ and $\overline{H}$ everywhere. Give your answers in spherical coordinates. Assume $\overline{A} = 0$. Factor out common terms, e.g., $C_0 \dfrac{e^{-jkr}}{r}$.

2) If the vector electric potential for an antenna is $\overline{F} = \hat{a}_x C_0 \dfrac{e^{-jkr}}{r}$, find $\overline{E} = \overline{E}_{FF}$ and $\overline{H} = \overline{H}_{FF}$ in the far-field. Give your answers in spherical coordinates. Assume $\overline{A} = 0$.

3) Given that the vector magnetic potential for an antenna is $\overline{A} = \hat{a}_\phi A_0 \sin\theta \left[\dfrac{e^{-jkr}}{r} + \dfrac{jke^{-jkr}}{r^2} \right]$, find $\overline{E}$ and $\overline{H}$ everywhere. Give your answers in spherical coordinates. Assume $\overline{F} = 0$. Factor out common terms, e.g., $A_0 \dfrac{e^{-jkr}}{r}$.

4) **EE 483** only: Given that the vector magnetic potential for an antenna is $\overline{A} = \hat{a}_\phi A_0 \sin\theta \left[\dfrac{e^{-jkr}}{r} + \dfrac{jke^{-jkr}}{r^2} \right]$, find $\overline{E} = \overline{E}_{FF}$ and $\overline{H} = \overline{H}_{FF}$ in the far-field. Give your answers in spherical coordinates. Assume $\overline{F} = 0$.

5) **EE 583** only: 3.2

Due Wednesday, February 11, 2026.