93(18): The ϕ Component of J

In this case:

$$R^{3}{}_{1}{}^{31} = g^{33} g^{11} R^{3}{}_{131} = g^{33} g^{11} g^{33} R_{3131}$$

$$= \left(g^{33}\right)^2 g^{11} R_{1313} = \left(g^{33}\right)^2 R^{1}{}_{313}$$

$$= -\frac{x}{2r^2} \cdot \frac{1}{r^2 \sin^2\theta} \quad - (1)$$

$$R^{3}{}_{2}{}^{32} = g^{33} g^{22} R^{3}{}_{232} = \left(g^{33}\right)^2 g^{22} R_{3232}$$

$$= \left(g^{33}\right)^2 g^{22} R_{2323} = \left(g^{33}\right)^2 R^{2}{}_{323}$$

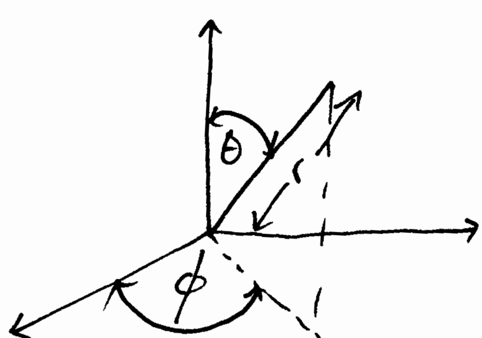
$$= \frac{x}{r^2} \cdot \frac{1}{r^2 \sin^2\theta} \quad - (2)$$

$$R^{3}{}_{0}{}^{30} = g^{33} g^{00} R^{3}{}_{030} = \left(g^{33}\right)^2 g^{00} R_{3030}$$

$$= \left(g^{33}\right)^2 g^{00} R_{0303} = \left(g^{33}\right)^2 R^{0}{}_{303}$$

$$= -\frac{x}{2r^2} \cdot \frac{1}{r^2 \sin^2\theta} \quad - (3)$$

$$\boxed{J_\phi = -\frac{A^{(0)}}{\mu_0}\left(R^{3}{}_{0}{}^{30} + R^{3}{}_{1}{}^{31} + R^{3}{}_{2}{}^{32}\right) = 0} \quad - (4)$$



Spherical polar Coordinates

93(18): The ϕ Component of J

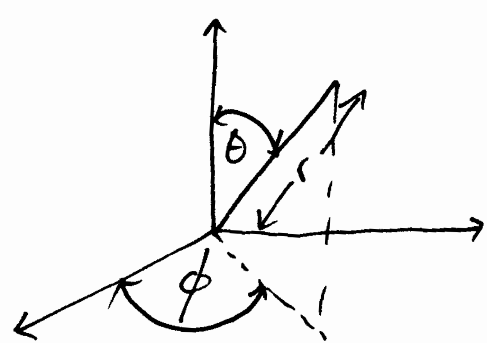
In this case:

$$R^{3}{}_{1}{}^{31} = g^{33} g^{11} R^{3}{}_{131} = g^{33} g^{11} g^{33} R_{3131}$$
$$= \left(g^{33}\right)^2 g^{11} R_{1313} = \left(g^{33}\right)^2 R^{1}{}_{313}$$
$$= -\frac{x}{2r^2} \cdot \frac{1}{r^2 \sin^2\theta} \quad -(1)$$

$$R^{3}{}_{2}{}^{32} = g^{33} g^{22} R^{3}{}_{232} = \left(g^{33}\right)^2 g^{22} R_{3232}$$
$$= \left(g^{33}\right)^2 g^{22} R_{2323} = \left(g^{33}\right)^2 R^{2}{}_{323}$$
$$= \frac{x}{r^2} \cdot \frac{1}{r^2 \sin^2\theta} \quad -(2)$$

$$R^{3}{}_{0}{}^{30} = g^{33} g^{00} R^{3}{}_{030} = \left(g^{33}\right)^2 g^{00} R_{3030}$$
$$= \left(g^{33}\right)^2 g^{00} R_{0303} = \left(g^{33}\right)^2 R^{0}{}_{303}$$
$$= -\frac{x}{2r^2} \cdot \frac{1}{r^2 \sin^2\theta} \quad -(3)$$

$$\boxed{J_\phi = -\frac{A^{(0)}}{\mu_0}\left(R^{3}{}_{0}{}^{30} + R^{3}{}_{1}{}^{31} + R^{3}{}_{2}{}^{32}\right) = 0} \quad -(4)$$



Spherical polar Coordinates