1) 93(13): Calculation of J^1_1

The J^1_1 element needs $R^{0}{}_{0}{}^{10}$ and also:

$$R^1{}_2{}^{12} = g^{11} g^{22} R^1{}_{212} \quad -(1)$$

$$R^1{}_3{}^{13} = g^{11} g^{33} R^1{}_{313} \quad -(2)$$

Here:

$$R^1{}_{212} = r e^{-2\beta} \partial_1 \beta = -r e^{2\alpha} \partial_1 \alpha \quad -(3)$$

$$R^1{}_{313} = R^1{}_{212} \sin^2\theta \quad -(4)$$

with:

$$e^{2\alpha} = -(1-x), \quad \partial_1 \alpha = \frac{1}{2r}\left(e^{-2\alpha} - 1\right) \quad -(5)$$

so:

$$e^{2\alpha} \partial_1 \alpha = \frac{1}{2r}\left(1 - e^{2\alpha}\right) \quad -(6)$$

$$= \frac{2-x}{2r}. \quad -(7)$$

We have:

$$g^{11} = 1-x, \quad g^{22} = \frac{1}{r^2}, \quad g^{33} = \frac{1}{r^2 \sin^2\theta}$$

and:

$$\left. \begin{aligned} R^1{}_{212} &= \frac{1}{2}(x-2), \\ R^1{}_{313} &= R^1{}_{212} \sin^2\theta. \end{aligned} \right\} -(8)$$

So:

$$\left. \begin{aligned} R^1{}_2{}^{12} &= \frac{1}{2} g^{11} g^{22} (x-2) \\ R^1{}_3{}^{13} &= \frac{1}{2} g^{11} g^{33} (x-2) \sin^2\theta \end{aligned} \right] -(9).$$

Thus:

$$\left. \begin{aligned} R^1{}_2{}^{12} &= \frac{1}{2r^2}(1-x)(x-2) \\ R^1{}_3{}^{13} &= R^1{}_2{}^{12} \end{aligned} \right] -(10)$$

2)

So:

$$R^1{}_0{}^{10} + R^1{}_2{}^{12} + R^1{}_3{}^{13}$$

$$= \frac{1}{r^2}\left(x(1-x) - (1-x)(2-x)\right)$$

$$= -\frac{2}{r^2}(1-x)^2$$

$$J^1{}_1 = \frac{A^{(0)}}{\mu_0} \cdot \frac{2}{r^2}\left(1 - \frac{2GM}{rc^2}\right)^2 \quad -(11)$$

In the limit $x << 1$

$$J^1{}_1 \rightarrow \frac{2A^{(0)}}{\mu_0} \cdot \frac{1}{r^2} \quad -(12)$$

This is the radial component of the current density. The vacuum limit of the Maxwell Heaviside theory is:

$$(\underline{\nabla} \times \underline{B})^1{}_1 = \frac{1}{c^2}\left(\frac{\partial E}{\partial t}\right)^1{}_1 \quad -(13)$$

and corresponds to:

$$\left.\begin{array}{l} r \rightarrow \infty, \\ x << 1. \end{array}\right\} \quad -(14)$$

In ECE theory is the additional component $J^1{}_1$, which changes all the electrodynamical properties.