19th June, 2005

Sir,

I have carefully read your reply. It is painfully clear to me that you have understood none of my arguments. I could address each of your arguments in turn and demonstrate why they are incorrect, but it seems to me that this would be a complete waste of time and energy. Therefore, I shall address only one of your arguments, for it is this one misconception that is central to all your, quite fallacious, arguments.

Your interpretation of your transformation of the standard metric for Minkowski space in terms of Schwarzschild's original form is wrong. Evidently you think that because you call your new variable by the pronumeral $r$ that it must be a radius. The pronumeral used is actually of no account whatsoever. Furthermore, you do not understand the very basic geometrical relations between the components of the metric tensor. Consider the standard Minkowski metric,

$$ds^2 = dt^2 - dr^2 - r^2(d\theta^2 + \sin^2\theta d\varphi^2)\,, \qquad (1)$$

$$0 \le r < \infty\,.$$

The spatial component of (1) describes a sphere of radius $r$ centred at $r = 0$. Compare it with the generalised metric,

$$ds^2 = A(r)dt^2 - B(r)dr^2 - C(r)(d\theta^2 + \sin^2\theta d\varphi^2)\,, \qquad (2)$$

$$A, B, C, > 0 \ \forall \ r \neq r_0\,,$$

where $r_0$ is an entirely arbitrary lower bound on the real parameter $r$. On (2) I identify the radius of curvature $R_c$, the proper radius $R_p$, the real-valued $r$-parameter, the surface area $A_s$ of the associated sphere, and the volume $V$ of the said sphere, thus

$$R_c = \sqrt{C(r)}\,,$$

$$R_p = \int_{r_0}^{r} \sqrt{B(r)}\, dr\,, \qquad (3)$$

$$\text{the real-valued } r - \text{parameter is just the variable } r\,,$$

$$A_s = C(r)\int_0^{\pi} \sin\theta\, d\theta \int_0^{2\pi} d\varphi\,,$$

$$V = \int_{r_0}^{r} C(r)\sqrt{B(r)}\, dr \int_0^{\pi} \sin\theta\, d\theta \int_0^{2\pi} d\varphi\,.$$

I remark that I could already generalise equation (2) further, so that $r_0$ can be approached from above and below, but I will not include that complication at this point. Now I also remark that the geometrical relations between the components of the metric tensor of (1) are precisely the same as those between the components of the metric tensor of (2). This is a matter of geometry, not of opinion.

Comparing (1) with (2), it is easily seen that for (1),

$$R_c = r\,,$$

$$R_p = \int_0^r dr = r\,,$$

$$A_s = r^2 \int_0^\pi \sin\theta\; d\theta \int_0^{2\pi} d\varphi = 4\pi r^2 = 4\pi R_c^2 = 4\pi R_p^2\,,$$

$$V = \int_0^r r^2\; dr \int_0^\pi \sin\theta\; d\theta \int_0^{2\pi} d\varphi = \frac{4}{3}\pi r^3 = \frac{4}{3}\pi R_c^3 = \frac{4}{3}\pi R_p^3\,,$$

so $R_c \equiv R_p \equiv r$, owing to the pseudo-Euclidean nature of (1) and the lower bound on $r$ at $r_0 = 0$.

Next consider your transformation of (1), which I write as,

$$r = (z^3 + a^3)^{\frac{1}{3}}\,, \tag{4}$$

so (1) becomes,

$$ds^2 = dt^2 - \frac{z^4}{(z^3+a^3)^{\frac{4}{3}}} dz^2 - (z^3+a^3)^{\frac{2}{3}}(d\theta^2 + \sin^2\theta d\varphi^2)\,, \tag{5}$$

where, owing to (4),

$$-a \le z < \infty\,. \tag{6}$$

You denote $z$ by $r$, and think that it is still a radius as in (1), and that $z = 0$ is the origin. This is not correct. Your $r$ for my $z$ in (5) is no longer a radius, as is plain from equations (4), (5), and (6), but is instead, a real-valued parameter for the radius on (5). Indeed,

$$R_c = (z^3 + a^3)^{\frac{1}{3}}\,,$$

$$R_p = \int_{-a}^{z} \frac{z^2}{(z^3+a^3)^{\frac{2}{3}}}\; dz = (z^3+a^3)^{\frac{1}{3}} \equiv R_c\,,$$

$$A_s = (z^3+a^3)^{\frac{2}{3}} \int_0^\pi \sin\theta\; d\theta \int_0^{2\pi} d\varphi = 4\pi(z^3+a^3)^{\frac{2}{3}} = 4\pi R_c^2 = 4\pi R_p^2\,,$$

$$V = \int_{-a}^{z} z^2 \; dz \int_{0}^{\pi} \sin\theta \; d\theta \int_{0}^{2\pi} d\varphi = \frac{4}{3}\pi(z^3 + a^3)$$

$$= \frac{4}{3}\pi R_c^3 = \frac{4}{3}\pi R_p^3 .$$

Once again, $R_p \equiv R_c$ owing to the pseudo-Euclidean nature of (5). Note however that $R_p \equiv R_c \neq z$. The variable $z$ in (5) is not a radial coordinate on (5), contrary to your claims. It is nothing more than a parameter for the determination of the radial quantities $R_c$ and $R_p$ according to the geometrial relations between the components of the metric tensor, given in (3). Your comparison of (5) with Schwarzschild's real solution is flawed because Schwarzschild's original solution relates to the pseudo-Riemannian goemetry of the gravitational field, whereas (5) describes Minkowski space, over and above your incorrect interpretation of the significance of the parameter $z$. Thus, your arguments are errors compounded with errors.

Now in the gravitational field, $R_p \neq R_c$, and $r$ is merely a real-valued parameter for the determination of $R_p$ and $R_c$, thus

$$ds^2 = \left(1 - \frac{\alpha}{\sqrt{C(r)}}\right) dt^2 - \left(1 - \frac{\alpha}{\sqrt{C(r)}}\right)^{-1} [d\sqrt{C(r)}]^2 - C(r)(d\theta^2 + \sin^2\theta d\varphi^2)\,, \tag{7a}$$

$$= \left(1 - \frac{\alpha}{\sqrt{C(r)}}\right) dt^2 - \left(1 - \frac{\alpha}{\sqrt{C(r)}}\right)^{-1} \frac{[C'(r)]^2}{4C(r)} dr^2 - C(r)(d\theta^2 + \sin^2\theta d\varphi^2)\,, \tag{7b}$$

$$R_c = \sqrt{C(r)}\,,$$

$$R_p = \int_{r_0}^{r} \sqrt{\frac{\sqrt{C(r)}}{\sqrt{C(r)} - \alpha}} \; \frac{C'(r)}{2\sqrt{C(r)}} \; dr = \int_{\sqrt{C(r_0)}}^{\sqrt{C(r)}} \sqrt{\frac{\sqrt{C(r)}}{\sqrt{C(r)} - \alpha}} \; d\sqrt{C(r)}\,,$$

$$A_s = C(r) \int_{0}^{\pi} \sin\theta \; d\theta \int_{0}^{2\pi} d\varphi = 4\pi C(r)\,,$$

$$V = \int_{\sqrt{C(r_0)}}^{\sqrt{C(r)}} \sqrt{\frac{\sqrt{C(r)}}{\sqrt{C(r)} - \alpha}} C(r) \; d\sqrt{C(r)} \int_{0}^{\pi} \sin\theta \; d\theta \int_{0}^{2\pi} d\varphi\,,$$

where I have shown elsewhere that $\sqrt{C(r_0)} \equiv \alpha = 2m \; \forall \; r_0$. Clearly, $R_p \neq R_c$, owing to the non-Euclidean nature of equations (7).

I shall now generalise (1) so that the origin is located at any arbitrary $r_0$, in which case the radius no longer takes the same value as the coordinate $r$, thus,

$$ds^2 = dt^2 - (d|r - r_0|)^2 - |r - r_0|^2 (d\theta^2 + \sin^2\theta d\varphi^2) \tag{8a}$$

$$= dt^2 - \frac{(r-r_0)^2}{|r-r_0|^2} dr^2 - |r-r_0|^2 (d\theta^2 + \sin^2\theta d\varphi^2) \quad (8b)$$

$$= dt^2 - dr^2 - |r-r_0|^2 (d\theta^2 + \sin^2\theta d\varphi^2)\,, \quad (8c)$$

$$R_c = |r-r_0|\,,$$

$$R_p = \int_0^{|r-r_0|} d|r-r_0| = \int_{r_0}^{r} \frac{(r-r_0)}{|r-r_0|}\, dr = |r-r_0| \equiv R_c\,,$$

$$A_s = |r-r_0|^2 \int_0^{\pi} \sin\theta d\theta \int_0^{2\pi} d\varphi = 4\pi |r-r_0|^2 = 4\pi R_p^2 = 4\pi R_c^2\,,$$

$$V = \int_0^{|r-r_0|} |r-r_0|^2\; d|r-r_0| \int_0^{\pi} \sin\theta d\theta \int_0^{2\pi} d\varphi$$

$$= \int_{r_0}^{r} |r-r_0|^2 \frac{(r-r_0)}{|r-r_0|}\, dr \int_0^{\pi} \sin\theta d\theta \int_0^{2\pi} d\varphi$$

$$= \frac{4}{3}\pi |r-r_0|^3 = \frac{4}{3}\pi R_p^3 = \frac{4}{3}\pi R_c^3\,.$$

These equations clearly render Euclidean forms, owing to the pseudo-Euclidean nature of equations (8). Note that $R_p \equiv R_c$ but $R_c \neq r$. The origin for equations (8) is at the arbitrary $r_0$, and $r_0$ can be approached from above or below, and $r = 0$ is not an origin unless $r_0 = 0$, in which case equations (8) reduce to equation (1). There is nothing special about $r = 0$ that makes it always the origin. Equation (1) is merely a special case of equations (8). The radius of the sphere associated with equations (8) must be determined by the geometrical relations (3), which are common to all forms (2).

In the case of the metric for the gravitational field for the simple point-mass, equations (7), the fact that $R_c(r_0) = \sqrt{C(r_0)} \equiv \alpha = 2m$ when $R_p(r_0) = 0$, i .e. $R_p(r_0) \equiv 0$, is an inescapable consequence of Einstein's geometry. There is nothing more point-like in the gravitational field. The usual conception of a point in Minkowski space does not exist in Einstein's gravitational field. Notwithstanding, point-masses and point-charges are fictitious and so point-mass and point-charge solutions are all nonsense. I have also dealt with this issue in my published papers. The correction of the geometrical error of the relativists leads directly to the results I have reported in my published papers, viz:

(a) Black holes have no theoretical basis whatsoever.

(b) All solutions of Einstein's field equations purporting an expanding Universe are incorrect. The Friedmann solution, the Lemaître-Robertson solution, the Robertson-Walker solution, the Einstein-de Sitter solution, etc. are nothing more than mathematical gibberish - meaningless concoctions of mathematical symbols.

(c) The conventional interpretation of the Hubble relation and the CMB are not consistent with General Relativity.

(d) The Big Bang hypothesis has no basis in theory whatsoever.

(e) Cosmologically, Einstein's theory of gravitation admits only of the flat, infinite, static, empty spacetime of Special Relativity, which, being devoid of matter, cannot describe the Universe other than locally.

That concludes my address of technical matters. I now address you on the personal level.

I must first apologise, as you for a gentleman I mistook. In all the email you sent me you included rude, arrogant, condescending, stupid, and insulting remarks. You have rightly earnt yourself a bloody nose, and if not for the distance between us I might well have visited you to deliver the causative blow, not because of your incompetent technical argument, but because your behaviour has been that of an arsehole. It seems that you are doomed to live and die a conceited shithead, and, moreover, a conceited shithead who cannot do even elementary geometry.

Stephen J. Crothers.