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ERRATUM

Erratum to: Scalar–vector–tensor gravity from preferred reference frame effects

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The relation (3.3) should be corrected with $\xi = 1$. In that case the action functional defined by (3.5) becomes

$$I_{GJBD} = \frac{3}{8\pi}\int dx^4 \left\{ \frac{\omega a^3 \dot{\phi}_L^2}{6\phi_L} + \phi_L a \dot{a}^2 \right\}. \tag{0.1}$$

Corrected forms of the equations defined by (3.6) and (3.7) will be, respectively,

$$\frac{2\ddot{a}}{a} + \frac{2\dot{a}^2}{a^2} + \frac{2\dot{a}\dot{\phi}_L}{a\phi_L} - \frac{\omega\dot{\phi}_L^2}{2\phi_L^2} = 0 \tag{0.2}$$

and

$$\frac{\omega\ddot{\phi}_L}{3\phi_L} - \frac{\omega\dot{\phi}_L^2}{6\phi_L^2} + \frac{\omega\dot{a}\dot{\phi}_L}{a\phi_L} - \frac{\dot{a}^2}{a^2} = 0. \tag{0.3}$$

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The equations defined by (3.9) and (3.10) should be changed by the following equations, respectively:

$$2\dot{U} + 4U^2 + 2UV - \frac{\omega}{2}V^2 = 0 \tag{0.4}$$

and

$$\frac{\omega}{3}\dot{V} + \frac{\omega}{6}V^2 + \omega UV - U^2 = 0. \tag{0.5}$$

The relations defined by (3.11) and (3.12) should be replaced by the following forms, respectively:

$$\Delta = \frac{V}{U} = -12\left(2 + \frac{1}{\omega}\right) \tag{0.6}$$

and

$$\omega_{\pm} = \frac{-275 \pm i\sqrt{407}}{528} \tag{0.7}$$

which cannot be take a physical solution. Corrected forms of the relation defined by (3.13) become $\Delta_{\pm} = \frac{-13 \pm i\sqrt{23}}{4}$ (one can obtain easily a singular contracting vacuum solution as $a = a_0(t/t_0)^x$ and $\phi^L = \phi_0^L(t/t_0)^y$ where dynamical equations leads to $x < 0$ and $0 < y < 1$ or $y > 2$. Also the dynamical equations defined by (0.2) and (0.3) leads to a singular expanding vacuum solution with choice of $x > 0$ and $1 < y < 2$). Time–time component of the stress tensor defined by (3.15) is equal to the Hamiltonian density of the action functional defined by (3.5) such as follows:

$$\rho(t) = \frac{3}{8\pi}\left\{\frac{\omega\dot{\phi}_L^2}{6\phi_L} + \frac{\phi_L\dot{a}^2}{a^2}\right\} \tag{0.8}$$

which should be replaced with (3.17). In the relation (3.19) we will have $\phi^L(t) = \phi_0^L(t/t_0)^{2-3\lambda}$. Corrected form of the equation (3.20) is obtained as

$$\lambda = \frac{6\omega \pm \sqrt{48(3\omega+2)\pi\rho_0 t_0^2/\phi_0^L - 24\omega}}{3(3\omega+2)}. \tag{0.9}$$

The relation defined by (3.22) should be replaced by the following equation:

$$\omega > -\frac{2}{3}, \quad \phi_0^L = \frac{16\pi\rho_0}{3(3\omega+2)\sigma^2}. \tag{0.10}$$

The above condition predicts that for $\phi_0^L > 0$ and $\omega < -\frac{2}{3}$, there should be negative mass densities $\rho_0 < 0$, in the universe! But it corresponds to $\phi_0^E > 0$ when we use (3.23) with $\xi = 1$.

The relation (3.24) should be corrected as

$$\phi_0^E = -\frac{16\pi\rho_0}{3(3\omega+2)\sigma^2}. \tag{0.11}$$

Relations defined by (3.27) and (3.28) should be changed, respectively, such as follows:

$$\varepsilon_\pm = \frac{4\omega \pm \sqrt{8\pi\rho_0 t_0^2(8\omega+3)/\phi_0^L - 6\omega}}{8\omega+3} \tag{0.12}$$

and

$$\phi_0^L \leq 4\pi\rho_0 t_0^2\left(\frac{8}{3}+\frac{1}{\omega}\right). \tag{0.13}$$

The relation defined by (3.30) should be corrected as

$$\omega > -\frac{3}{8}, \quad \phi_0^L = \frac{8\pi\rho_0}{(8\omega+3)\zeta^2}. \tag{0.14}$$