

Robertson-Walker Metric of a flat universe:

$$\boxed{x^\mu}$$

$$\begin{aligned}x^0 &= t. \\ x^1 &= r. \\ x^2 &= \theta. \\ x^3 &= \phi.\end{aligned}$$

$$\boxed{g_{\mu\nu}}$$

$$\begin{aligned}g_{00} &= 1 - r^2 H(t)^2. \\ g_{01} &= r H(t). \\ g_{02} &= 0. \\ g_{03} &= 0. \\ g_{10} &= r H(t). \\ g_{11} &= -1. \\ g_{12} &= 0. \\ g_{13} &= 0. \\ g_{20} &= 0. \\ g_{21} &= 0. \\ g_{22} &= -r^2. \\ g_{23} &= 0. \\ g_{30} &= 0. \\ g_{31} &= 0. \\ g_{32} &= 0. \\ g_{33} &= -r^2 \sin(\theta)^2.\end{aligned}$$

$$\boxed{\sqrt{-\det(g_{\mu\nu})}}$$

$$\sqrt{-} = \sqrt{r^4 \sin(\theta)^2}.$$

$$\boxed{g^{\mu\nu}}$$

$$\begin{aligned}g^{00} &= 1. \\ g^{01} &= r H(t). \\ g^{02} &= 0. \\ g^{03} &= 0. \\ g^{10} &= r H(t). \\ g^{11} &= -1 + r^2 H(t)^2. \\ g^{12} &= 0. \\ g^{13} &= 0. \\ g^{20} &= 0. \\ g^{21} &= 0. \\ g^{22} &= -\frac{1}{r^2}. \\ g^{23} &= 0. \\ g^{30} &= 0. \\ g^{31} &= 0. \\ g^{32} &= 0. \\ g^{33} &= -\frac{1}{r^2 \sin(\theta)^2}.\end{aligned}$$

$$\boxed{\Gamma^\sigma_{\mu\nu}}$$

$$\begin{aligned}\Gamma^0_{00} &= r^2 H(t)^3. \\ \Gamma^0_{01} &= -r H(t)^2. \\ \Gamma^0_{02} &= 0. \\ \Gamma^0_{03} &= 0. \\ \Gamma^0_{10} &= -r H(t)^2. \\ \Gamma^0_{11} &= H(t). \\ \Gamma^0_{12} &= 0. \\ \Gamma^0_{13} &= 0. \\ \Gamma^0_{20} &= 0. \\ \Gamma^0_{21} &= 0. \\ \Gamma^0_{22} &= r^2 H(t). \\ \Gamma^0_{23} &= 0. \\ \Gamma^0_{30} &= 0. \\ \Gamma^0_{31} &= 0. \\ \Gamma^0_{32} &= 0. \\ \Gamma^0_{33} &= r^2 \sin(\theta)^2 H(t).\end{aligned}$$

$$\begin{aligned}\Gamma^1_{00} &= -r H(t)^2 + r^3 H(t)^4 - \dot{H}(t) r. \\ \Gamma^1_{01} &= -r^2 H(t)^3. \\ \Gamma^1_{02} &= 0. \\ \Gamma^1_{03} &= 0. \\ \Gamma^1_{10} &= -r^2 H(t)^3. \\ \Gamma^1_{11} &= r H(t)^2. \\ \Gamma^1_{12} &= 0. \\ \Gamma^1_{13} &= 0. \\ \Gamma^1_{20} &= 0. \\ \Gamma^1_{21} &= 0. \\ \Gamma^1_{22} &= r(-1 + r^2 H(t)^2). \\ \Gamma^1_{23} &= 0. \\ \Gamma^1_{30} &= 0. \\ \Gamma^1_{31} &= 0. \\ \Gamma^1_{32} &= 0. \\ \Gamma^1_{33} &= r \sin(\theta)^2(-1 + r^2 H(t)^2).\end{aligned}$$

$$\begin{aligned}\Gamma_{00}^2 &= 0, \\ \Gamma_{01}^2 &= 0, \\ \Gamma_{02}^2 &= 0, \\ \Gamma_{03}^2 &= 0, \\ \Gamma_{10}^2 &= 0, \\ \Gamma_{11}^2 &= 0, \\ \Gamma_{12}^2 &= \frac{1}{r}, \\ \Gamma_{13}^2 &= 0, \\ \Gamma_{20}^2 &= 0, \\ \Gamma_{21}^2 &= \frac{1}{r}, \\ \Gamma_{22}^2 &= 0, \\ \Gamma_{23}^2 &= 0, \\ \Gamma_{30}^2 &= 0, \\ \Gamma_{31}^2 &= 0, \\ \Gamma_{32}^2 &= 0, \\ \Gamma_{33}^2 &= -\sin(\theta)\cos(\theta).\end{aligned}$$

$$\begin{aligned}\Gamma_{00}^3 &= 0, \\ \Gamma_{01}^3 &= 0, \\ \Gamma_{02}^3 &= 0, \\ \Gamma_{03}^3 &= 0, \\ \Gamma_{10}^3 &= 0, \\ \Gamma_{11}^3 &= 0, \\ \Gamma_{12}^3 &= 0, \\ \Gamma_{13}^3 &= \frac{1}{r}, \\ \Gamma_{20}^3 &= 0, \\ \Gamma_{21}^3 &= 0, \\ \Gamma_{22}^3 &= 0, \\ \Gamma_{23}^3 &= \frac{\cos(\theta)}{\sin(\theta)}, \\ \Gamma_{30}^3 &= 0, \\ \Gamma_{31}^3 &= \frac{1}{r}, \\ \Gamma_{32}^3 &= \frac{\cos(\theta)}{\sin(\theta)}, \\ \Gamma_{33}^3 &= 0.\end{aligned}$$

$$\boxed{R_{\mu\nu}}$$

$$\begin{aligned}R_{00} &= -3r^2H(t)^4 + 3\dot{H}(t) + 3H(t)^2 - \dot{H}(t)r^2H(t)^2, \\ R_{01} &= 3rH(t)^3 + \dot{H}(t)rH(t), \\ R_{02} &= 0, \\ R_{03} &= 0, \\ R_{10} &= 3rH(t)^3 + \dot{H}(t)rH(t), \\ R_{11} &= -\dot{H}(t) - 3H(t)^2, \\ R_{12} &= 0, \\ R_{13} &= 0, \\ R_{20} &= 0, \\ R_{21} &= 0, \\ R_{22} &= -\dot{H}(t)r^2 - 3r^2H(t)^2, \\ R_{23} &= 0, \\ R_{30} &= 0, \\ R_{31} &= 0, \\ R_{32} &= 0, \\ R_{33} &= -3r^2\sin(\theta)^2H(t)^2 - \dot{H}(t)r^2\sin(\theta)^2.\end{aligned}$$

$$\boxed{R^{\mu}_{\nu}}$$

$$\begin{aligned}R^0_0 &= 3\dot{H}(t) + 3H(t)^2, \\ R^0_1 &= 0, \\ R^0_2 &= 0, \\ R^0_3 &= 0, \\ R^1_0 &= 2\dot{H}(t)rH(t), \\ R^1_1 &= \dot{H}(t) + 3H(t)^2, \\ R^1_2 &= 0, \\ R^1_3 &= 0, \\ R^2_0 &= 0, \\ R^2_1 &= 0, \\ R^2_2 &= \dot{H}(t) + 3H(t)^2, \\ R^2_3 &= 0, \\ R^3_0 &= 0, \\ R^3_1 &= 0, \\ R^3_2 &= 0, \\ R^3_3 &= \dot{H}(t) + 3H(t)^2.\end{aligned}$$

$$\boxed{R}$$

$$R = 6\dot{H}(t) + 12H(t)^2,$$

$$\boxed{G^{\mu}_{\nu}}$$

$$\begin{aligned}G^0_0 &= -3H(t)^2, \\ G^0_1 &= 0, \\ G^0_2 &= 0, \\ G^0_3 &= 0, \\ G^1_0 &= 2\dot{H}(t)rH(t), \\ G^1_1 &= -2\dot{H}(t) - 3H(t)^2, \\ G^1_2 &= 0, \\ G^1_3 &= 0, \\ G^2_0 &= 0, \\ G^2_1 &= 0, \\ G^2_2 &= -2\dot{H}(t) - 3H(t)^2, \\ G^2_3 &= 0, \\ G^3_0 &= 0, \\ G^3_1 &= 0, \\ G^3_2 &= 0, \\ G^3_3 &= -2\dot{H}(t) - 3H(t)^2.\end{aligned}$$

$$\boxed{G}$$

$$G = -6\dot{H}(t) - 12H(t)^2,$$

$$\boxed{G^\mu_{\nu\gamma\mu}=0}$$

$$G^\mu_{0\mu}=0.$$

$$G^\mu_{1\mu}=0.$$

$$G^\mu_{2\mu}=0.$$

$$G^\mu_{3\mu}=0.$$

$$\boxed{g^{\mu\nu}\,\Gamma^\lambda_{\mu\nu}=0?}$$

$$g^{\mu\nu}\,\Gamma^0_{\mu\nu}=-r^4H(t)-r^4H(t)^5-r^4\sin(\theta)^4H(t)-H(t)-r^2H(t)^3.$$

$$g^{\mu\nu}\,\Gamma^1_{\mu\nu}=-2rH(t)^2+r^3-r^5H(t)^2+r^3\sin(\theta)^4+\dot{H}(t)r^3H(t)^2-r^5H(t)^6-\dot{H}(t)r-r^5\sin(\theta)^4H(t)^2.$$

$$g^{\mu\nu}\,\Gamma^2_{\mu\nu}=r^2\sin(\theta)^3\cos(\theta).$$

$$g^{\mu\nu}\,\Gamma^3_{\mu\nu}=0.$$