

Robertson-Walker Metric locally Minkowski:

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

$$\begin{aligned}x^0 &= t. \\ x^1 &= x. \\ x^2 &= y. \\ x^3 &= z.\end{aligned}$$

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

$$\begin{aligned}g_{00} &= \left(R(t)^m\right)^2. \\ g_{01} &= 0. \\ g_{02} &= 0. \\ g_{03} &= 0. \\ g_{10} &= 0. \\ g_{11} &= -\left(R(t)^n\right)^2. \\ g_{12} &= 0. \\ g_{13} &= 0. \\ g_{20} &= 0. \\ g_{21} &= 0. \\ g_{22} &= -\left(R(t)^n\right)^2. \\ g_{23} &= 0. \\ g_{30} &= 0. \\ g_{31} &= 0. \\ g_{32} &= 0. \\ g_{33} &= -\left(R(t)^n\right)^2.\end{aligned}$$

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

$$\sqrt{=\sqrt{\left(R(t)^m\right)^2\left(R(t)^n\right)^6}}.$$

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

$$\begin{aligned}g^{00} &= \frac{1}{\left(R(t)^m\right)^2}. \\ g^{01} &= 0. \\ g^{02} &= 0. \\ g^{03} &= 0. \\ g^{10} &= 0. \\ g^{11} &= -\frac{1}{\left(R(t)^n\right)^2}. \\ g^{12} &= 0. \\ g^{13} &= 0. \\ g^{20} &= 0. \\ g^{21} &= 0. \\ g^{22} &= -\frac{1}{\left(R(t)^n\right)^2}. \\ g^{23} &= 0. \\ g^{30} &= 0. \\ g^{31} &= 0. \\ g^{32} &= 0. \\ g^{33} &= -\frac{1}{\left(R(t)^n\right)^2}.\end{aligned}$$

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

$$\begin{aligned}\Gamma^0_{00} &= \frac{m\dot{R}(t)}{R(t)}. \\ \Gamma^0_{01} &= 0. \\ \Gamma^0_{02} &= 0. \\ \Gamma^0_{03} &= 0. \\ \Gamma^0_{10} &= 0. \\ \Gamma^0_{11} &= \frac{n\left(R(t)^n\right)^2\dot{R}(t)}{\left(R(t)^m\right)^2R(t)}. \\ \Gamma^0_{12} &= 0. \\ \Gamma^0_{13} &= 0. \\ \Gamma^0_{20} &= 0. \\ \Gamma^0_{21} &= 0. \\ \Gamma^0_{22} &= \frac{n\left(R(t)^n\right)^2\dot{R}(t)}{\left(R(t)^m\right)^2R(t)}. \\ \Gamma^0_{23} &= 0. \\ \Gamma^0_{30} &= 0. \\ \Gamma^0_{31} &= 0. \\ \Gamma^0_{32} &= 0. \\ \Gamma^0_{33} &= \frac{n\left(R(t)^n\right)^2\dot{R}(t)}{\left(R(t)^m\right)^2R(t)}.\end{aligned}$$

$$\begin{aligned}\Gamma^1_{00} &= 0. \\ \Gamma^1_{01} &= \frac{n\dot{R}(t)}{\dot{R}(t)}. \\ \Gamma^1_{02} &= 0. \\ \Gamma^1_{03} &= 0. \\ \Gamma^1_{10} &= \frac{n\dot{R}(t)}{R(t)}. \\ \Gamma^1_{11} &= 0. \\ \Gamma^1_{12} &= 0. \\ \Gamma^1_{13} &= 0. \\ \Gamma^1_{20} &= 0. \\ \Gamma^1_{21} &= 0. \\ \Gamma^1_{22} &= 0. \\ \Gamma^1_{23} &= 0. \\ \Gamma^1_{30} &= 0. \\ \Gamma^1_{31} &= 0. \\ \Gamma^1_{32} &= 0. \\ \Gamma^1_{33} &= 0.\end{aligned}$$

$$\Gamma_{00}^2=0.$$

$$\Gamma_{01}^2=0.$$

$$\Gamma_{02}^2=\frac{n\hat{R}(t)}{R(t)}.$$

$$\Gamma_{03}^2=0.$$

$$\Gamma_{10}^2=0.$$

$$\Gamma_{11}^2=0.$$

$$\Gamma_{12}^2=0.$$

$$\Gamma_{13}^2=0.$$

$$\Gamma_{20}^2=\frac{n\hat{R}(t)}{\hat{R}(t)}.$$

$$\Gamma_{21}^2=0.$$

$$\Gamma_{22}^2=0.$$

$$\Gamma_{23}^2=0.$$

$$\Gamma_{30}^2=0.$$

$$\Gamma_{31}^2=0.$$

$$\Gamma_{32}^2=0.$$

$$\Gamma_{33}^2=0.$$

$$\Gamma_{00}^3=0.$$

$$\Gamma_{01}^3=0.$$

$$\Gamma_{02}^3=0.$$

$$\Gamma_{03}^3=\frac{n\hat{R}(t)}{R(t)}.$$

$$\Gamma_{10}^3=0.$$

$$\Gamma_{11}^3=0.$$

$$\Gamma_{12}^3=0.$$

$$\Gamma_{13}^3=0.$$

$$\Gamma_{20}^3=0.$$

$$\Gamma_{21}^3=0.$$

$$\Gamma_{22}^3=0.$$

$$\Gamma_{23}^3=0.$$

$$\Gamma_{30}^3=\frac{n\hat{R}(t)}{R(t)}.$$

$$\Gamma_{31}^3=0.$$

$$\Gamma_{32}^3=0.$$

$$\Gamma_{33}^3=0.$$

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

$$R_{00}=-3\frac{n\hat{R}(t)^2+mn\hat{R}(t)^2-n^2\hat{R}(t)^2-\hat{R}(t)R(t)n}{R(t)^2}.$$

$$R_{01}=0.$$

$$R_{02}=0.$$

$$R_{03}=0.$$

$$R_{10}=0.$$

$$R_{11}=\frac{(R(t)^m)^6n(R(t)^n)^2\hat{R}(t)^2-(R(t)^m)^6\hat{R}(t)R(t)n(R(t)^n)^2-3(R(t)^m)^6n^2(R(t)^n)^2\hat{R}(t)^2+m(R(t)^m)^6n(R(t)^n)^2\hat{R}(t)^2}{(R(t)^m)^8R(t)^2}.$$

$$R_{12}=0.$$

$$R_{13}=0.$$

$$R_{20}=0.$$

$$R_{21}=0.$$

$$R_{22}=\frac{(R(t)^m)^6n(R(t)^n)^2\hat{R}(t)^2-(R(t)^m)^6\hat{R}(t)R(t)n(R(t)^n)^2-3(R(t)^m)^6n^2(R(t)^n)^2\hat{R}(t)^2+m(R(t)^m)^6n(R(t)^n)^2\hat{R}(t)^2}{(R(t)^m)^8R(t)^2}.$$

$$R_{23}=0.$$

$$R_{30}=0.$$

$$R_{31}=0.$$

$$R_{32}=0.$$

$$R_{33}=\frac{(R(t)^m)^6n(R(t)^n)^2\hat{R}(t)^2-(R(t)^m)^6\hat{R}(t)R(t)n(R(t)^n)^2-3(R(t)^m)^6n^2(R(t)^n)^2\hat{R}(t)^2+m(R(t)^m)^6n(R(t)^n)^2\hat{R}(t)^2}{(R(t)^m)^8R(t)^2}.$$

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

$$R^0_0=-3\frac{n\hat{R}(t)^2}{(R(t)^m)^2R(t)^2}+3\frac{\hat{R}(t)n}{(R(t)^m)^2R(t)}+3\frac{n^2\hat{R}(t)^2}{(R(t)^m)^2R(t)^2}-3\frac{mn\hat{R}(t)^2}{(R(t)^m)^2R(t)^2}.$$

$$R^1_1=0.$$

$$R^2_2=0.$$

$$R^3_3=0.$$

$$R^4_0=0.$$

$$R^1_1=-\frac{n\hat{R}(t)^2}{(R(t)^m)^2R(t)^2}+\frac{\hat{R}(t)n}{(R(t)^m)^2R(t)}+3\frac{n^2\hat{R}(t)^2}{(R(t)^m)^2R(t)^2}-\frac{mn\hat{R}(t)^2}{(R(t)^m)^2R(t)^2}.$$

$$R^1_2=0.$$

$$R^1_3=0.$$

$$R^2_0=0.$$

$$R^2_1=0.$$

$$R^2_2=-\frac{n\hat{R}(t)^2}{(R(t)^m)^2R(t)^2}+\frac{\hat{R}(t)n}{(R(t)^m)^2R(t)}+3\frac{n^2\hat{R}(t)^2}{(R(t)^m)^2R(t)^2}-\frac{mn\hat{R}(t)^2}{(R(t)^m)^2R(t)^2}.$$

$$R^2_3=0.$$

$$R^3_0=0.$$

$$R^3_1=0.$$

$$R^3_2=0.$$

$$R^3_3=-\frac{n\hat{R}(t)^2}{(R(t)^m)^2R(t)^2}+\frac{\hat{R}(t)n}{(R(t)^m)^2R(t)}+3\frac{n^2\hat{R}(t)^2}{(R(t)^m)^2R(t)^2}-\frac{mn\hat{R}(t)^2}{(R(t)^m)^2R(t)^2}.$$

$$\boxed{R}$$

$$R=-6\frac{n\hat{R}(t)^2}{(R(t)^m)^2R(t)^2}+6\frac{\hat{R}(t)n}{(R(t)^m)^2R(t)}+12\frac{n^2\hat{R}(t)^2}{(R(t)^m)^2R(t)^2}-6\frac{mn\hat{R}(t)^2}{(R(t)^m)^2R(t)^2}.$$

$$G^\mu_\nu$$

$$G^0_0=-3\frac{n^2\dot{R}(t)^2}{(R(t)^m)^2R(t)^2}.$$

$$G^0_1=0.$$

$$G^0_2=0.$$

$$G^0_3=0.$$

$$G^1_0=0.$$

$$G^1_1=2\frac{n\dot{R}(t)^2}{(R(t)^m)^2R(t)^2}-2\frac{\ddot{R}(t)n}{(R(t)^m)^2R(t)}-3\frac{n^2\dot{R}(t)^2}{(R(t)^m)^2R(t)^2}+2\frac{mn\dot{R}(t)^2}{(R(t)^m)^2R(t)^2}.$$

$$G^1_2=0.$$

$$G^1_3=0.$$

$$G^2_0=0.$$

$$G^2_1=0.$$

$$G^2_2=2\frac{n\dot{R}(t)^2}{(R(t)^m)^2R(t)^2}-2\frac{\ddot{R}(t)n}{(R(t)^m)^2R(t)}-3\frac{n^2\dot{R}(t)^2}{(R(t)^m)^2R(t)^2}+2\frac{mn\dot{R}(t)^2}{(R(t)^m)^2R(t)^2}.$$

$$G^2_3=0.$$

$$G^3_0=0.$$

$$G^3_1=0.$$

$$G^3_2=0.$$

$$G^3_3=2\frac{n\dot{R}(t)^2}{(R(t)^m)^2R(t)^2}-2\frac{\ddot{R}(t)n}{(R(t)^m)^2R(t)}-3\frac{n^2\dot{R}(t)^2}{(R(t)^m)^2R(t)^2}+2\frac{mn\dot{R}(t)^2}{(R(t)^m)^2R(t)^2}.$$

$$G$$

$$G=6\frac{n\dot{R}(t)^2}{(R(t)^m)^2R(t)^2}-6\frac{\ddot{R}(t)n}{(R(t)^m)^2R(t)}-12\frac{n^2\dot{R}(t)^2}{(R(t)^m)^2R(t)^2}+6\frac{mn\dot{R}(t)^2}{(R(t)^m)^2R(t)^2}.$$

$$G^\mu{}_{\nu;\mu}=0$$

$$G^\ell_{0;\mu}=0.$$

$$G^u_{1;\mu}=0.$$

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

$$G^e_{3;\mu}=0.$$

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

$$g^{\mu\nu}\,\Gamma^0_{\mu\nu}=\frac{m(R(t)^m)^2\dot{R}(t)}{R(t)}-3\frac{n(R(t)^m)^4\dot{R}(t)}{(R(t)^m)^2R(t)}.$$

$$g^{\mu\nu}\,\Gamma^1_{\mu\nu}=0.$$

$$g^{\mu\nu}\,\Gamma^2_{\mu\nu}=0.$$

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