

Robertson-Walker Metric locally Minkowski:

$x^\mu$

$x^0 = t.$   
 $x^1 = x.$   
 $x^2 = y.$   
 $x^3 = z.$

$g_{\mu\nu}$

$g_{00} = R(t)^{(1.5)}.$   
 $g_{01} = 0.$   
 $g_{02} = 0.$   
 $g_{03} = 0.$   
 $g_{10} = 0.$   
 $g_{11} = -\frac{1}{\sqrt{R(t)}}.$   
 $g_{12} = 0.$   
 $g_{13} = 0.$   
 $g_{20} = 0.$   
 $g_{21} = 0.$   
 $g_{22} = -\frac{1}{\sqrt{R(t)}}.$   
 $g_{23} = 0.$   
 $g_{30} = 0.$   
 $g_{31} = 0.$   
 $g_{32} = 0.$   
 $g_{33} = -\frac{1}{\sqrt{R(t)}}.$

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

$\sqrt{} = 1.$

$g^{\mu\nu}$

$g^{00} = \frac{1}{R(t)^{(1.5)}}.$   
 $g^{01} = 0.$   
 $g^{02} = 0.$   
 $g^{03} = 0.$   
 $g^{10} = 0.$   
 $g^{11} = -\sqrt{R(t)}.$   
 $g^{12} = 0.$   
 $g^{13} = 0.$   
 $g^{20} = 0.$   
 $g^{21} = 0.$   
 $g^{22} = -\sqrt{R(t)}.$   
 $g^{23} = 0.$   
 $g^{30} = 0.$   
 $g^{31} = 0.$   
 $g^{32} = 0.$   
 $g^{33} = -\sqrt{R(t)}.$

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

$\Gamma^0_{00} = (0.75)\frac{\dot{R}(t)}{R(t)}.$   
 $\Gamma^0_{01} = 0.$   
 $\Gamma^0_{02} = 0.$   
 $\Gamma^0_{03} = 0.$   
 $\Gamma^0_{10} = 0.$   
 $\Gamma^0_{11} = -(0.25)\frac{\dot{R}(t)}{R(t)^{(3.0)}}.$   
 $\Gamma^0_{12} = 0.$   
 $\Gamma^0_{13} = 0.$   
 $\Gamma^0_{20} = 0.$   
 $\Gamma^0_{21} = 0.$   
 $\Gamma^0_{22} = -(0.25)\frac{\dot{R}(t)}{R(t)^{(3.0)}}.$   
 $\Gamma^0_{23} = 0.$   
 $\Gamma^0_{30} = 0.$   
 $\Gamma^0_{31} = 0.$   
 $\Gamma^0_{32} = 0.$   
 $\Gamma^0_{33} = -(0.25)\frac{\dot{R}(t)}{R(t)^{(3.0)}}.$

$\Gamma^1_{00} = 0.$   
 $\Gamma^1_{01} = -(0.25)\frac{\dot{R}(t)}{R(t)}.$   
 $\Gamma^1_{02} = 0.$   
 $\Gamma^1_{03} = 0.$   
 $\Gamma^1_{10} = -(0.25)\frac{\dot{R}(t)}{R(t)}.$   
 $\Gamma^1_{11} = 0.$   
 $\Gamma^1_{12} = 0.$   
 $\Gamma^1_{13} = 0.$   
 $\Gamma^1_{20} = 0.$   
 $\Gamma^1_{21} = 0.$   
 $\Gamma^1_{22} = 0.$   
 $\Gamma^1_{23} = 0.$   
 $\Gamma^1_{30} = 0.$   
 $\Gamma^1_{31} = 0.$   
 $\Gamma^1_{32} = 0.$   
 $\Gamma^1_{33} = 0.$

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

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

$$\Gamma_{02}^2=-(0.25)\frac{\dot{R}(t)}{R(t)}.$$

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

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

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

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

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

$$\Gamma_{20}^2=-(0.25)\frac{\dot{R}(t)}{R(t)}.$$

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

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

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

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

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

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

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

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

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

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

$$\Gamma_{03}^3=-(0.25)\frac{\dot{R}(t)}{R(t)}.$$

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

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

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

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

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

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

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

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

$$\Gamma_{30}^3=-(0.25)\frac{\dot{R}(t)}{R(t)}.$$

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

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

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

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

$$R_{00}=(1.5)\frac{\dot{R}(t)^2}{R(t)^{(2.0)}}-(0.75)\frac{\ddot{R}(t)}{R(t)}.$$

$$R_{01}=0.$$

$$R_{02}=0.$$

$$R_{03}=0.$$

$$R_{10}=0.$$

$$R_{11}=-(0.625)\frac{\ddot{R}(t)^2}{R(t)^{(4.0)}}+(0.25)\frac{\ddot{R}(t)}{R(t)^{(3.0)}}.$$

$$R_{12}=0.$$

$$R_{13}=0.$$

$$R_{20}=0.$$

$$R_{21}=0.$$

$$R_{22}=-(0.625)\frac{\ddot{R}(t)^2}{R(t)^{(4.0)}}+(0.25)\frac{\ddot{R}(t)}{R(t)^{(3.0)}}.$$

$$R_{23}=0.$$

$$R_{30}=0.$$

$$R_{31}=0.$$

$$R_{32}=0.$$

$$R_{33}=-(0.625)\frac{\ddot{R}(t)^2}{R(t)^{(4.0)}}+(0.25)\frac{\ddot{R}(t)}{R(t)^{(3.0)}}.$$

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

$$R^0_0=-(0.75)\frac{\ddot{R}(t)}{R(t)^{(2.5)}}+(1.5)\frac{\ddot{R}(t)^2}{R(t)^{(3.5)}}.$$

$$R^0_1=0.$$

$$R^0_2=0.$$

$$R^0_3=0.$$

$$R^1_0=0.$$

$$R^1_1=-(0.25)\frac{\ddot{R}(t)}{R(t)^{(2.5)}}+(0.625)\frac{\ddot{R}(t)^2}{R(t)^{(3.5)}}.$$

$$R^1_2=0.$$

$$R^1_3=0.$$

$$R^2_0=0.$$

$$R^2_1=0.$$

$$R^2_2=-(0.25)\frac{\ddot{R}(t)}{R(t)^{(2.5)}}+(0.625)\frac{\ddot{R}(t)^2}{R(t)^{(3.5)}}.$$

$$R^2_3=0.$$

$$R^3_0=0.$$

$$R^3_1=0.$$

$$R^3_2=0.$$

$$R^3_3=-(0.25)\frac{\ddot{R}(t)}{R(t)^{(2.5)}}+(0.625)\frac{\ddot{R}(t)^2}{R(t)^{(3.5)}}.$$

$$\boxed{R}$$

$$R=-(1.5)\frac{\ddot{R}(t)}{R(t)^{(2.5)}}+(3.375)\frac{\ddot{R}(t)^2}{R(t)^{(3.5)}}.$$

$$\boxed{G^\mu_\nu}$$

$$G^0_0 = -(0.1875)\frac{\dot{R}(t)^2}{R(t)^{(3.5)}}.$$

$$G^0_1 = 0.$$

$$G^0_2 = 0.$$

$$G^0_3 = 0.$$

$$G^1_0 = 0.$$

$$G^1_1 = (0.5)\frac{\ddot{R}(t)}{R(t)^{(2.5)}} - (1.0625)\frac{\dot{R}(t)^2}{R(t)^{(3.5)}}.$$

$$G^1_2 = 0.$$

$$G^1_3 = 0.$$

$$G^2_0 = 0.$$

$$G^2_1 = 0.$$

$$G^2_2 = (0.5)\frac{\ddot{R}(t)}{R(t)^{(2.5)}} - (1.0625)\frac{\dot{R}(t)^2}{R(t)^{(3.5)}}.$$

$$G^2_3 = 0.$$

$$G^3_0 = 0.$$

$$G^3_1 = 0.$$

$$G^3_2 = 0.$$

$$G^3_3 = (0.5)\frac{\ddot{R}(t)}{R(t)^{(2.5)}} - (1.0625)\frac{\dot{R}(t)^2}{R(t)^{(3.5)}}.$$

$$\boxed{G}$$

$$G = (1.5)\frac{\ddot{R}(t)}{R(t)^{(2.5)}} - (3.375)\frac{\dot{R}(t)^2}{R(t)^{(3.5)}}.$$

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

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

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

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

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

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

$$g^{\mu\nu}\,\Gamma^0_{\mu\nu} = (0.75)\frac{\dot{R}(t)}{R(t)^{(3.5)}} + (0.75)\dot{R}(t)\sqrt{R(t)}.$$

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

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

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