In this file you find all sorts of misprints. There are quite many but it does not mean that the book is entirely bad. On the contrary, it gives you the opportunity to carry out a lot of calculations, and it is a good starting point. If the misprint is marked by an asterix (*) it means that you can find a more thorough calculation in my file 'lots of calculations' on my homepage http://physicssusan.mono.net/9035/General%20Relativity. The list is not complete, it covers the chapters 1-13 and the final exam, but I will post more on my homepage as I get along. I have made this list entirely on my own, and should you find that I have made something wrong or missed something, which I am bound to, please do not hesitate to contact me: logik.susan@gmail.com

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Chapter 1

p.2 l.20 operator to the right-hand side of (1.1), we obtain
p.6 l.6-7 clock 1 at time t', and the reflected beam arrives at the location of clock 1 at time t_2.

p.12 l.12 $\cancel{t}ct' =$

p.16 l.13 $\beta_3{}^2 = \frac{(\beta_1 + \beta_2)^2}{(1 + \beta_1\beta_2)^2}$

l.15 $\beta_3 = \frac{\beta_1 + \beta_2}{1 + \beta_1\beta_2}$

Chapter 2

p.29 l.18 $Vf = (V^a e_a)f = V^a \partial_a$

p.33 l.7 as shown in Fig. 2-5

p.34 l.4 $ds^2 = dr^2 + r^2 d\theta^2 + r^2 \sin^2\theta \, d\phi^2$ (2.9)

p.40 l.15 $g^{yx}x^2 + g^{yy} = 0$

l.16 $g^{yy} = -x^2 g^{yx}$

p.41 l.11 $W_x = x^2(0) + 1(1) = 1$

l.12 $W_y = 1(0) - 1(1) = -1$

l.13 $\Rightarrow W_a = (1, -1)$

p.42 l.4 $= g_{ae} R^e{}_{bcd}$

p.44 l.12 $\partial_r = \frac{\partial x}{\partial r}\partial_x + \frac{\partial y}{\partial r}\partial_y + \frac{\partial z}{\partial r}\partial_z$

Chapter 3

p.49 l.5 U_1. A point p that belongs to the manifold M (say in U_1)

p.55 l.3 $Q^a{}_b = S^a{}_b - T^a{}_b$

Chapter 4

p.67 l.2 $= \left(\frac{\partial A^b}{\partial x^a} + \Gamma^b{}_{ca}A^c\right)e_b$

l.5 $\nabla_b A^a = \frac{\partial A^a}{\partial x^b} + \Gamma^a{}_{bc}A^c$ (4.6)

p.73 l.3 $\frac{\partial g_{ca}}{\partial x^b}$

l.15 $\Gamma^a{}_{bc} = g^{ad}\Gamma_{bcd}$

l.17 $\Gamma^a{}_{bc} = \frac{1}{2}g^{ad}\left(\frac{\partial g_{bd}}{\partial x^c} + \frac{\partial g_{cd}}{\partial x^b} - \frac{\partial g_{bc}}{\partial x^d}\right)$ (4.16)

p.75 l.2 the last term

l.3 $\Gamma^\phi{}_{bc} = \frac{1}{2}g^{\phi\phi}\left(\frac{\partial g_{\phi b}}{\partial x^c} + \frac{\partial g_{\phi c}}{\partial x^b}\right)$

l.5 $\Gamma^\phi{}_{\phi\theta} = \frac{1}{2}g^{\phi\phi}\left(\frac{\partial g_{\phi\theta}}{\partial \phi} + \frac{\partial g_{\phi\phi}}{\partial \theta}\right) =$

p.80 l.6 $(a\alpha + b\beta) \wedge \gamma = a\alpha \wedge \gamma + b\beta \wedge \gamma$

p.81 l.17 $L_V W^a = V^b \nabla_b W^a - W^b \nabla_b V^a$ (4.27)

l.19 $L_V T_{ab} = V^c \nabla_c T_{ab} + T_{cb}\nabla_a V^c + T_{ac}\nabla_b V^c$ (4.28)

p.83 l.18 (*) $\frac{d^2\phi}{ds^2} + \frac{2}{r}\frac{dr}{ds}\frac{d\phi}{ds} = 0$

p.85 l.13 (*) $\Rightarrow \Gamma^\tau{}_{\xi\tau} = \frac{1}{\xi} = \Gamma^\tau{}_{\tau\xi}$

p.86	l.6		$R_{abcd} = g_{ae}R^{e}{}_{bcd}$
p.87	l.3		All together, in n dimensions, there are $n^2(n^2-1)/12$ independent ~~nonzero~~ components …
	l.10		R_{1212} ; R_{1313} ; R_{2323} ; R_{1213} ; $R_{1232} = R_{2123}$; $R_{1323} = R_{3132}$
p.88	l.1		… of the Riemann tensor in two dimensions are …

Chapter 5

p.105	l.15		…two arbitrary one-forms.
p.120	l.4	(*)	$R^{\hat\phi}{}_{\hat r\hat r\hat\phi} = -\dfrac{\dot a^2 + k}{a^2}$
	Q3	(*)	$\Gamma^{r}{}_{\phi\phi} = (\Lambda^{-1})^{r}{}_{\hat r}\Gamma^{\hat r}{}_{\hat\phi\hat\phi}\Lambda^{\hat\phi}{}_{\phi}\Lambda^{\hat\phi}{}_{\phi} = 1\left(-\dfrac{1}{r}\right)(r\sin\theta)^2 = -r\sin^2\theta$
	Q4	(*)	$\Gamma^{\hat u}{}_{\hat v\hat v} = \Gamma^{\hat v}{}_{\hat u\hat v} = +\dfrac{1}{u}$
p.121	Q5		Where are the "hats"?
	Q7	(*)	$G_{\hat t\hat t} = \dfrac{1}{R^2}\left[-Re^{2\Psi}\left(2R'\Psi' + 2R'' + R^{-1}R'^2\right) - 2\dot R\dot\Psi R + 1 + \dot R^2\right]$
	Q8		Example 5-3

Chapter 6

p.130	l.15		Cases 2 and 3 in our	
p.133	l.5		$L_u\eta^a = u^b\nabla_b\eta^a - \eta^b\nabla_b u^a = 0$	
	l.19		$\nabla_a S^c{}_b = \partial_a S^c{}_b + \Gamma^c{}_{ad}S^d{}_b - \Gamma^d{}_{ba}S^c{}_d$	
	l.24		$\nabla_b\nabla_a V^c = \partial_b(\partial_a V^c + \cdots$	
p.134	l.4		$\partial_a(\partial_b V^c - \Gamma^c{}_{eb}V^e) - \partial_b(\partial_a V^c + \cdots$	(6.2)
p.135	l.2		$= R^c{}_{dab}V^d$	(6.3)
p.136	l.1		However, since u^a is the tangent	
p.137	l.12		$\Gamma^a{}_{bc} = \dfrac{1}{2}g^{ad}\left(\dfrac{\partial g_{bd}}{\partial x^c} + \dfrac{\partial g_{cd}}{\partial x^b} - \dfrac{\partial g_{bc}}{\partial x^d}\right)$	(4.16)
p.139	l.21		$ds^2 = -dt^2 + e^{2b(t,r)}dr^2 + R^2(t,r)d\phi^2$	
p.141	l.18	(*)	$= -\dfrac{1}{R}\dfrac{\partial R}{\partial t}\omega^{\hat\phi}\wedge\omega^{\hat t} - \dfrac{1}{R}\dfrac{\partial R}{\partial r}e^{-b(t,r)}\omega^{\hat\phi}\wedge\omega^{\hat r}$	
p.143	l.3		$\Rightarrow \Gamma^{\hat r}{}_{\hat\phi\hat\phi} =$	
	l.7		$= \dfrac{1}{2}R^{\hat a}{}_{\hat b\hat c\hat d}\omega^{\hat c}\wedge\omega^{\hat d}$	(6.21)
p.144	l.10		$\Omega^{\hat r}{}_{\hat t} =$	
p.146	l.4		we write out $\Omega^{\hat t}{}_{\hat\phi} =$	
	l.6		$\Omega^{\hat t}{}_{\hat\phi} =$	
	l.11		$R^{\hat t}{}_{\hat\phi\hat t\hat\phi} =$	
p.147	l.2		Using the results of Example 6-2	
	l.15	(*)	$R^{\hat\phi}{}_{\hat t\hat\phi\hat r} = -R^{\hat t}{}_{\hat\phi\hat r\hat\phi}$	
	l.18		$R_{\hat r\hat r} = R^{\hat c}{}_{\hat r\hat c\hat r} = R^{\hat t}{}_{\hat r\hat t\hat r} + R^{\hat r}{}_{\hat r\hat r\hat r} + R^{\hat\phi}{}_{\hat r\hat\phi\hat r}$	(6.29)
p.149	l.5	(*)	$G_{\hat t\hat r} = -\dfrac{e^{-b(t,r)}}{R}\dfrac{\partial^2 R}{\partial t\partial r} + \dfrac{e^{-b(t,r)}}{R}\dfrac{\partial b}{\partial t}\dfrac{\partial R}{\partial r}$	

	l.8		$ds^2 = -dt^2 + e^{2b(t,r)}dr^2 + R^2(t,r)d\phi^2$, this is easy enough:	
	l.9	(*)	$\Lambda^{\hat{a}}{}_b = \begin{pmatrix} 1 & 0 & 0 \\ 0 & e^{b(t,r)} & 0 \\ 0 & 0 & R(t,r) \end{pmatrix}$	(6.33)
	l.15	(*)	$G_{tt} = \Lambda^{\hat{t}}{}_t \Lambda^{\hat{t}}{}_t G_{\hat{t}\hat{t}} = (1)(1)G_{\hat{t}\hat{t}}$	(6.35)
	l.18	(*)	$(1)\left(e^{b(t,r)}\right)\left(-\frac{e^{-b(t,r)}}{R}\frac{\partial^2 R}{\partial t \partial r} + \frac{e^{-b(t,r)}}{R}\frac{\partial b}{\partial t}\frac{\partial R}{\partial r}\right)$	(6.36)
p.153	Q5		$\Gamma^{\hat{t}}{}_{\hat{r}\hat{r}}$	
	Q6		$\Gamma^{\hat{r}}{}_{\hat{\phi}\hat{\phi}}$	

Chapter 7

p.155	l.9		tensor and energy-momentum tensor interchangeably.	
p.159	l.4		$\gamma = \frac{1}{\sqrt{1-\left(\frac{v}{c}\right)^2}}$	
	l.16		$= \gamma^2 \frac{\partial \rho}{\partial t} + \gamma^2 \frac{\partial(\rho u^x)}{\partial x} + \gamma^2 \frac{\partial(\rho u^y)}{\partial y} + \gamma^2 \frac{\partial(\rho u^z)}{\partial z}$	
	l.17		$= \gamma^2 \frac{\partial \rho}{\partial t} + \gamma^2 \nabla \cdot (\rho \vec{u})$	
p.160	l.15		…the metric tensor g_{ab}	
	l.18		$T^{ab} = Au^a u^b + Bg^{ab}$	(7.8)
p.161	l.3		$T^{ij} = B\eta^{ij}$	
	l.6		$= Au^0 u^0 + B\eta^{00} =$	
	l.9		$= (\rho + P)u^a u^b - P\eta^{ab}$	(7.10)
	l.11		$= (\rho + P)u^a u^b - Pg^{ab}$	(7.11)
	l.14		$= (\rho + P)u^a u^b + P\eta^{ab}$	(7.12)
	l.15		$= (\rho + P)u^a u^b + Pg^{ab}$	
p.162	l.5		$G_{\hat{a}\hat{b}} + \Lambda\eta_{\hat{a}\hat{b}} = 8\pi T_{\hat{a}\hat{b}}$	(7.14)
	l.13		Putting this together with (7.14) and (7.13), we have	
	l.14		$G_{\hat{t}\hat{t}} + \Lambda\eta_{\hat{t}\hat{t}} = 8\pi T_{\hat{t}\hat{t}}$	
	l.15	(*)	$\Rightarrow \frac{3}{a^2}(k + \dot{a}^2) - \Lambda = 8\pi\rho$	(7.17)
	l.18		$G_{\hat{r}\hat{r}} + \Lambda\eta_{\hat{r}\hat{r}} = 8\pi T_{\hat{r}\hat{r}}$	
	l.19	(*)	$\Rightarrow 2\frac{\ddot{a}}{a} + \frac{1}{a^2}(k + \dot{a}^2) - \Lambda = -8\pi P$	(7.18)
p.165	l.10		worldline~~s~~	

Chapter 8

p.171	l.6	$\nabla_\theta X_\theta = \partial_\theta X_\theta - \Gamma^c{}_{\theta\theta} X_c = \partial_\theta X_\theta - \Gamma^\theta{}_{\theta\theta} X_\theta - \Gamma^\phi{}_{\theta\theta} X_\phi$
p.172	l.17	$\partial_\theta X_\phi = \partial_\theta[-\sin\theta\cos\theta \int f(\phi')d\phi' + g(\theta)]$
p.174	l.8	$P(t) = \int p(t)dt$
	l.10	$y(t) = e^{-P(t)} \int e^{P(t)} r(t)dt + Ce^{-P(t)}$
	l.14	$P(\theta) =$
	l.16	$e^{-P(\theta)} =$
	l.17	From this we deduce that $e^{P(\theta)} =$

p.176	l.20		$X^{\theta} = g^{\theta\theta} X_{\theta} = \frac{1}{a^2} X_{\theta}$	
	l.22		$X^{\phi} = g^{\phi\phi} X_{\phi} = \frac{1}{a^2} \frac{1}{\sin^2\theta} X_{\phi}$	
p.177	l.6		$= \frac{1}{a^2}(A\cos\phi + B\sin\phi)\partial_{\theta} + \frac{1}{a^2}[C - \cot\theta\,(A\sin\phi - B\cos\phi)]\partial_{\phi}$	
	l.7		$= A'\cos\phi\,\partial_{\theta} - A'\cot\theta\sin\phi\,\partial_{\phi} + B'\sin\phi\,\partial_{\theta} + B'\cot\theta\cos\phi\,\partial_{\phi} + C'\partial_{\phi}$	
	l.8		$= A'L_x + B'L_y + C'L_z$	
	l.17		$\nabla_b\nabla_c X^a - \nabla_c\nabla_b X^a = R^a{}_{bcd} X^d$	(8.6)
	l.19	(*)	$\nabla_a\nabla_b X^b - \nabla_b\nabla_a X^b = R_{ac} X^c$	(8.7)
	l.21	(*)	$X^a \nabla_a R = L_X R$	(8.8)
p.178	l.5		$\nabla_b T^{ab} = 0$	
p.179	l.1		(b) $\nabla_b\nabla_c X^a - \nabla_c\nabla_b X^a = R^a{}_{bcd} X^d$	
	l.4		(a) $X^a \nabla_a R = L_X R$	

Chapter 9

p.188	l.2		$= -r^2\sin^2\theta$
p.190	l.2		$m \cdot \overline{m} = m^a \cdot \overline{m_a} =$
	l.23		$\bar{\delta} = \overline{m^a}\nabla_a$
p.198	l.22	(*)	$\Gamma^{v}{}_{uu} = +\frac{1}{2}\frac{\partial H}{\partial u}$
p.199	l.8		Now $\nabla_b l_a =$ and so we can immediately…
	l.22		Having a look at the Christoffel symbols (9.29), we see …

Chapter 10

p.204	l.20		This tells us that the ~~metric~~ line element will not	
p.205	l.21		$= Cr^2 d\theta^2 + Cr^2\sin^2\theta\, d\phi^2 \cancel{\frac{1}{n}}$	
	l.26		$= \sqrt{C}\left(\frac{r}{2c}\frac{dC}{dr}\cancel{r} + 1\right)dr$	
p.207	l.19	(*)	$\cancel{\Gamma^{\hat{t}}{}_{\hat{t}} = \Gamma^{\hat{t}}{}_{\hat{\theta}} = \Gamma^{\hat{t}}{}_{\hat{\phi}} = 0}$	(10.16)
p.208	l.5	(*)	$\cancel{\Gamma^{\hat{\theta}}{}_{\hat{t}} = \Gamma^{\hat{\theta}}{}_{\hat{\theta}} = \Gamma^{\hat{\theta}}{}_{\hat{\phi}} = 0}$	(10.17)
	l.9	(*)	$\cancel{\Gamma^{\hat{\phi}}{}_{\hat{t}} = \Gamma^{\hat{\phi}}{}_{\hat{\phi}} = 0}$	(10.18)
p.210	l.12		$= -R^{\hat{r}}{}_{\hat{t}\hat{r}\hat{t}}$	
	l.19		$= -R^{\hat{t}}{}_{\hat{\phi}\hat{t}\hat{\phi}}$	
p.211	l.4		$R_{\hat{a}\hat{b}} = R^{\hat{c}}{}_{\hat{a}\hat{c}\hat{b}}$	
p.216	l.32		la~~r~~grangian	
p.217	l.18	(*)	$= -\frac{2}{1 - \frac{2m}{r}}\ddot{r} + \frac{4m}{r^2}\frac{1}{\left(1 - \frac{2m}{r}\right)^2}(\dot{r})^2$	
p.218	l.2	(*)	$= \frac{2m}{r^2}(\dot{t})^2 + \left(1 - \frac{2m}{r}\right)^{-2}\left(\frac{2m}{r^2}\right)(\dot{r})^2 - 2r(\dot{\theta})^2 - 2r\sin^2\theta\,(\dot{\phi})^2$	
p.220	l.19		$= -r^2\sin^2\theta\frac{d\phi}{d\tau} = -r^2\frac{d\phi}{d\tau}$	(10.48)
p.226	l.19		… and using $\cancel{y} r_0 = r\sin\phi$	

l.20 $\ldots \frac{1}{A} = r\sin\phi = \cancel{y} r_0$

l.21 the constant $1/A$ represents the

p.227 l.5 $u_1^p = D\sin^2\phi + E\cos^2\phi$

l.7 $u_1^p =$

l.8 $u_1^p =$

l.10 This line should be omitted: $\cancel{u_p'' + u_p = -D\sin^2\phi + 4D\sin^2\phi = 3D\sin^2\phi}$

l.11 $u_1^{p''} + u_1^p =$

l.14 $u_1^{p''} + u_1^p = A^2\sin^2\phi$

l.17 $u_1^{p''} + u_1^p = A^2\sin^2\phi$

p.228 l.17 and setting ~~this~~ u equal to zero

p.230 l.2 so we put ct in place of t and $\frac{G}{c^2}\frac{m}{r}$ in place of $\frac{m}{r}$

l.3 $ct = \frac{dr}{\sqrt{1-\frac{r_0^2}{r^2}}}\left(1+\frac{2m}{r}\frac{G}{c^2} - \frac{mr_0^2}{r^3}\frac{G}{c^2}\right)$

l.7 $\ldots + 2m\frac{G}{c^2}\ln\frac{\left(r_p+\sqrt{r_p{}^2-r_0{}^2}\right)\left(r_e+\sqrt{r_e{}^2-r_0{}^2}\right)}{r_0^2} - m\frac{G}{c^2}\left[\frac{\sqrt{r_p{}^2-r_0{}^2}}{r_p} - \frac{\sqrt{r_e{}^2-r_0{}^2}}{r_e}\right]$

l.20 Using the variational method described in Example 4-10, the nonzero Christoffel symbols for the general Schwarzschild metric are

p.231 Q2 (*) (b) $R_{rt} = \frac{2}{r}\left(\frac{d\lambda}{dt}\right)$

Q3 (*) (b) $\Gamma^{\hat r}{}_{\hat t\hat t} = \frac{3m-\Lambda r^3}{r^{3/2}\sqrt{9r-18m-3\Lambda r^3}}$

Chapter 11

p.236 l.27 ~~Eddington-Finkelstein Coordinates~~ The Radial Null Geodesic

p.238 l.10 (*) $t - t_0 = -\frac{2}{3\sqrt{2m}}\left(r^{3/2} - r_0^{3/2} + 6m\sqrt{r} - 6m\sqrt{r_0}\right) + 2m\ldots$

p.239 l.2 (*) $r - 2m = (r_0 - 2m)e^{-(t-t_0)/2m}$

p.245 l.26 $ds^2 = \left(1-\frac{2m}{\Sigma}\right)dt^2 + \frac{4amr\sin^2\theta}{\Sigma}dtd\theta - \cdots$ (11.9)

p.246 l.12 (*) $g^{\phi\phi} = -\frac{(\Delta - a^2\sin^2\theta)}{\Sigma\Delta\sin^2\theta}$ (11.13)

p.247 l.4 In this case, $\theta = \frac{\pi}{2}$,which

l.5 means that $\sin\theta = 1$ and

p.251 l.3 $R^2 = r^2 + a^2 + \frac{2m^3}{r}$ (11.19)

Chapter 12

p.258 l.11 Suppose that S represents the spacelike…

p.261 l.4 $e^{2f} = \frac{1}{C' - kr^2}$ (12.4)

l.5 To find the constant $C' = -2C$, we can use the …

l.13 $= 1 - C' + Kr^2 - Kr^2 = 1 - C' + 2Kr^2$

l.15 $1 - C' + 2Kr^2 = 2Kr^2$ or $1 - C' = 0 \Rightarrow C' = 1$

p.268 l.13 The detail were worked out in Example 7-3

P.273	l.20		$ds^2 = dt^2 - e^{2\sqrt{\frac{\Lambda}{3}}t}[dr^2 + r^2 d\theta^2 - r^2 \sin^2\theta\, d\phi^2]$
p.274	Fig. 12-5		The vertical coordinate is a not R
	l.1		The de Sitter solution represents a universe without matter and without radiation.
p.275	Fig. 12-6		The vertical coordinate is a not R
	l.10		$\frac{da}{dt} = 2C \sin\tau \cos\tau \frac{d\tau}{dt}$
p.276	Fig. 12-7		The vertical coordinate is a not R
	l.3		Integrating the left side becomes
p.277	l.11	(*)	$re^{2\nu(r)} = A + Br + \frac{1}{3}k^2\Lambda r^3$
	l.14		$R_{\hat\theta\hat\theta} = \eta_{\hat\theta\hat\theta}\Lambda$
	l.16	(*)	$B = -k^2$
	l.21	(*)	$dl^2 = \frac{dr^2}{1 - \frac{2m}{r} - \frac{1}{3}\Lambda r^2} + r^2 d\theta^2 + r^2 \sin^2\theta\, d\phi^2$

Chapter 13

p.280	l.25	$\Gamma^a{}_{bc} = \frac{1}{2} g^{ad}\left(\frac{\partial g_{bd}}{\partial x^c} + \frac{\partial g_{cd}}{\partial x^b} - \frac{\partial g_{bc}}{\partial x^d}\right)$	
p.282	l.6	$\Gamma^a{}_{bc} = \frac{1}{2} g^{ad}\left(\frac{\partial g_{bd}}{\partial x^c} + \frac{\partial g_{cd}}{\partial x^b} - \frac{\partial g_{bc}}{\partial x^d}\right)$	
	l.7	$= \frac{\varepsilon}{2} g^{ad}\left(\frac{\partial h_{bd}}{\partial x^c} + \frac{\partial h_{cd}}{\partial x^b} - \frac{\partial h_{bc}}{\partial x^d}\right)$	
	l.8	$= \frac{\varepsilon}{2}(\eta^{ad} - \varepsilon h^{ad})\left(\frac{\partial h_{bd}}{\partial x^c} + \frac{\partial h_{cd}}{\partial x^b} - \frac{\partial h_{bc}}{\partial x^d}\right)$	
	l.9	$= \frac{1}{2}(\varepsilon\eta^{ad} - \varepsilon^2 h^{ad})\left(\frac{\partial h_{bd}}{\partial x^c} + \frac{\partial h_{cd}}{\partial x^b} - \frac{\partial h_{bc}}{\partial x^d}\right)$	
	l.12	$= \frac{1}{2}\varepsilon\eta^{ad}\left(\frac{\partial h_{bd}}{\partial x^c} + \frac{\partial h_{cd}}{\partial x^b} - \frac{\partial h_{bc}}{\partial x^d}\right)$	(13.3)
p.283	l.3	$= \partial_c\left[\frac{1}{2}\varepsilon\eta^{ae}\left(\frac{\partial h_{be}}{\partial x^d} + \frac{\partial h_{de}}{\partial x^b} - \frac{\partial h_{bd}}{\partial x^e}\right)\right]$	
	l.4	$-\partial_d\left[\frac{1}{2}\varepsilon\eta^{af}\left(\frac{\partial h_{bf}}{\partial x^c} + \frac{\partial h_{cf}}{\partial x^b} - \frac{\partial h_{bc}}{\partial x^f}\right)\right]$	
	l.5	$= \frac{1}{2}\varepsilon\left(\eta^{ae}\frac{\partial^2 h_{be}}{\partial x^c \partial x^d} + \eta^{ae}\frac{\partial^2 h_{de}}{\partial x^c \partial x^b} - \eta^{ae}\frac{\partial^2 h_{bd}}{\partial x^c \partial x^e}\right)$	
	l.6	$-\frac{1}{2}\varepsilon\left(\eta^{af}\frac{\partial^2 h_{bf}}{\partial x^d \partial x^c} + \eta^{af}\frac{\partial^2 h_{cf}}{\partial x^d \partial x^b} - \eta^{af}\frac{\partial^2 h_{bc}}{\partial x^d \partial x^f}\right)$	
	l.7	Let's relabel it as f	
	l.12	The first term will cancel	
	l.13	$= \frac{1}{2}\varepsilon\eta^{ae}\left(-\frac{\partial^2 h_{bd}}{\partial x^c \partial x^f} + \frac{\partial^2 h_{df}}{\partial x^c \partial x^b} + \frac{\partial^2 h_{bc}}{\partial x^d \partial x^f} - \frac{\partial^2 h_{cf}}{\partial x^d \partial x^b}\right)$	(13.4)
	l.15	$R_{ab} = \partial_c\Gamma^c{}_{ab} - \partial_b\Gamma^c{}_{ac}$	
p.287	l.2	$\psi'^a{}_{b,a} = \psi^a{}_{b,a} - \Box\phi_b$	
	l.4	$W\phi_a = \psi^b{}_{a,b}$	
		$\psi'^a{}_{b,a}$	
	l.6	$\frac{1}{2}\varepsilon W\psi'_{ab} =$	

	l.8		$W\psi'_{ab} = 0$	
	l.14		$W\psi'_{ab} = W\left(h'_{ab} - \frac{1}{2}\eta_{ab}h'\right) = Wh'_{ab} - \frac{1}{2}W\eta_{ab}h' = 0$	
	l.16		$0 = W\psi'_{ab} = \eta^{ab}W\psi'_{ab} = W(\eta^{ab}\psi'_{ab}) = W({\psi'}^{b}{}_{b}) = W\psi' = -Wh'$	
	l.19		$W{h'}_{ab} = 0$	
p.288	l.13		tensor can be shown to be a function of h_{xx}, h_{xy}, h_{yx} and h_{yy} alone, in the Einstein gauge.	
p.289	l.1		derivatives with respect to y and $\cancel{z}x$ vanish	
p.293	l.11	(*)	$ds^2 = d^2t - d^2x - d^2y - d^2z + 2\varepsilon h_{xy}dxdy$	(13.19)
p.294	l.2	(*)	$ds^2 = dt^2 - (1 - \varepsilon h_{xy})dx'^2 - (1 + \varepsilon h_{xy})dy'^2 - dz^2$	(13.20)
p.299	l.5		~~(see Quiz)~~	
p.300	l.11		$-2\frac{a'}{a}XdudX$	
	l.12		$= b^2\left(-\frac{b'}{b}Ydu + \frac{1}{b}dY\right)^2 = \cdots - 2\frac{b'}{b}YdudY \ldots$	
p.303	l.4		The ~~curvature tensor~~ Weyl scalar	
p.304	l.11		$ds^2 = \delta(u)(X^2 - Y^2)du^2 + 2dudr - dX^2 - dY^2$	(13.42)
	l.13		~~(see Problem 7)~~	
p.305	l.15		(13.45)	
p.306	l.13		$= -\frac{1}{2}\partial_v g_{xx}$	
	l.14		$= -\frac{1}{2}\frac{\partial}{\partial v}(-[1 - v\Theta(v)]^2)$	
	l.15		$= (1 - v\Theta(v))\frac{\partial}{\partial v}(-v\Theta(v))$	
	l.16		$= (1 - v\Theta(v))\left(-\Theta(v) - \cancel{v\frac{d\Theta}{dv}}\right)$	
	l.17		$= -(1 - v\Theta(v))(\Theta(v) - \cancel{v\delta(v)})$	
	l.19		$\int_{-\infty}^{\infty} f(v)\delta(v)dv = f(0)$	
p.307	l.7		since n_u is ~~null~~ 1	
	l.8		$n_a = (1,0,0,0)$	
p.308	l.3		$m^a = \frac{1}{\sqrt{2}}\left(0,\quad 0,\quad -\frac{1}{(1 - v\Theta(v))},\quad -i\frac{1}{(1 + v\Theta(v))}\right)$	
	l.4		$\overline{m}^a = \frac{1}{\sqrt{2}}\left(0,\quad 0,\quad -\frac{1}{(1 - v\Theta(v))},\quad i\frac{1}{(1 + v\Theta(v))}\right)$	
p.309	l.2		$\overline{m}^x\overline{m}^x = \left(-\frac{1}{\sqrt{2}(1 - v\Theta(v))}\right)\left(-\frac{1}{\sqrt{2}(1 - v\Theta(v))}\right)$	
p.311	fig 13-11		$u^2 + v^2 = 1$	
p.315	l.6	(*)	$m_a = \frac{1}{\sqrt{2}}(0,\quad 0,\quad \cos av,\quad +i\cosh av)$	(13.56)
p.317	l.1		$\sigma = \frac{a}{2}(\tan av + \tanh av)$	
	l.6		$\Psi_0 = +D\sigma - 2\sigma\rho$	(13.57)
	l.11		$= \frac{\partial}{\partial v}\left[\frac{a}{2}(\tan av + \tanh av)\right]$	

	l.12	(*)	$= \frac{a^2}{2}(1 + \tan^2 av + 1 - \tanh^2 av)$
	l.14		$\Psi_0 = +D\sigma - 2\sigma\rho$
	l.15-18	(*)	$= \frac{a^2}{2}(1 + \tan^2 av + 1 - \tanh^2 av) - \cdots . = a^2$
p.318	l.7		*Nariai*
	l.9	(*)	$R_{ab} = -\Lambda g_{ab}$
	l.11	(*)	$\Omega = 1 + \frac{\Lambda}{4}(x^2 + y^2)$
	l.16	(*)	$g^{vv} = +\Lambda v^2$
	l.17	(*)	Some of the nonzero Christoffel symbols are
	l.18	(*)	$\Gamma^u{}_{uu} = +\Lambda v, \Gamma^v{}_{uu} = +\Lambda^2 v^3$
	l.24-25		These lines should be omitted
p.319	l.3		$n^a = (1, +\frac{1}{2}\Lambda v^2, 0,0)$
	l.19	(*)	$\Omega = 1 + \frac{\Lambda}{4}(x^2 + y^2)$
p.320	l.1		An exercise shows that if remaining nonzero spin coefficients vanish
	l.5		$= \rho\mu - \sigma\lambda + \alpha\bar{\alpha} + \beta\bar{\beta} - 2\alpha\beta + \gamma(\rho - \bar{\rho}) + \varepsilon(\mu - \bar{\mu}) - \Psi_2 + \Lambda_{\mathrm{NP}} + \Phi_{11}$ (13.59)
p.322	Q2		$= -2\sqrt{2}\mu\left(\frac{x}{x^2 + y^2} + i\frac{y}{x^2 + y^2}\right)$
	Q3		used in Example 13-1
			$\Phi_{22} = \delta\nu - \Delta\mu - \mu^2 - \lambda\bar{\lambda} - \mu(\gamma + \bar{\gamma}) + \bar{\nu}\pi - \nu(\tau - 3\beta - \bar{\alpha})$ (9.24)

Final Exam

p.323	E1	(*)	$\Delta s^2 \dots . E_1 = (-1,3,2,4)$
		(*)	$E_2 = (4,0,-1,1)$
p.324	E7	(*)	The nonzero Christoffel symbols are: $\Gamma^u{}_{uu} = -\Gamma^u{}_{vv} = \Gamma^v{}_{uv} = \frac{u}{(u^2+v^2)}$; $\Gamma^v{}_{vv} = -\Gamma^v{}_{uu} = \Gamma^u{}_{vu} = \frac{v}{(u^2+v^2)}$; $\Gamma^u{}_{\theta\theta} = -\frac{uv^2}{(u^2+v^2)}$; $\Gamma^v{}_{\theta\theta} = -\frac{u^2 v}{(u^2+v^2)}$; $\Gamma^\theta{}_{u\theta} = \frac{1}{u}$; $\Gamma^\theta{}_{v\theta} = \frac{1}{v}$
p.325	E9	(*)	$\Gamma^\psi{}_{\theta\theta} = -\cosh\psi \sinh\psi$, $\Gamma^\psi{}_{\phi\phi} = -\cosh\psi\sinh\psi\sin^2\theta$
	E10	(*)	The non-zero Ricci rotation coefficients are: $\Gamma^{\hat\psi}{}_{\hat\theta\hat\theta} = -\Gamma^{\hat\theta}{}_{\hat\psi\hat\theta} = -\coth\psi$, $\Gamma^{\hat\psi}{}_{\hat\phi\hat\phi} = -\Gamma^{\hat\phi}{}_{\hat\psi\hat\phi} = -\frac{\coth\psi}{\sin\theta}$, $\Gamma^{\hat\theta}{}_{\hat\phi\hat\phi} = -\Gamma^{\hat\phi}{}_{\hat\theta\hat\phi} = -\frac{\cot\theta}{\sinh^2\psi}$

Quiz and Exam Solutions

p.330	l.3	(*)	7.b
p.331	l.7	(*)	5.c
	l.9	(*)	13.a

Bibliografi

McMahon, D. (2006). *Relativity Demystified.* McGraw-Hill Companies, Inc.