

SIGN CONVENTIONS

This book follows the “Landau-Lifshitz Spacelike Convention” (LLSC). Arrows below mark signs that are “+” in it. The facing table shows signs that other authors use.

g sign
(col. 2)

$$+g = -(\omega^0)^2 + (\omega^1)^2 + (\omega^2)^2 + (\omega^3)^2$$

Riemann sign
(col. 3)

$$+\mathcal{R}(u, v) = \nabla_u \nabla_v - \nabla_v \nabla_u - \nabla_{[u, v]}$$

$$+R^\mu{}_{\nu\alpha\beta} = \partial_\alpha \Gamma^\mu{}_{\nu\beta} - \partial_\beta \Gamma^\mu{}_{\nu\alpha} + \Gamma^\mu{}_{\sigma\alpha} \Gamma^\sigma{}_{\nu\beta} - \Gamma^\mu{}_{\sigma\beta} \Gamma^\sigma{}_{\nu\alpha}$$

quotient of ***Einstein***
and ***Riemann*** signs

$$+R_{\mu\nu} = R^\alpha{}_{\mu\alpha\nu}$$

Einstein sign
(col. 4)

$$Einstein = +8\pi T$$

$$G_{\mu\nu} = R_{\mu\nu} - \frac{1}{2}g_{\mu\nu}R = +8\pi T_{\mu\nu}$$

all authors agree
on this “positive
energy density” sign

$$T_{\hat{0}\hat{0}} = T(e_{\hat{0}}, e_{\hat{0}}) > 0$$

The above sign choice for ***Riemann*** is convenient for coordinate-free methods, as in the curvature operator $\mathcal{R}(u, v)$ above, in the curvature 2-forms (equation 14.19), and for matrix computations (exercise 14.9). The definitions of ***Ricci*** and ***Einstein*** with the signs adopted above are those that make their eigenvalues (and $R \equiv R^\mu{}_\mu$) positive for standard spheres with positive definite metrics.

TABLE OF SIGN CONVENTIONS

Reference	g sign	Riemann	Einstein	Spacetime four-dimensional indices
Landau, Lifshitz (1962) "spacelike convention"	+	+	+	latin
Landau, Lifshitz (1971) "timelike convention"	-	+	+	latin
Misner, Thorne, Wheeler (1973; this text)	+	+	+	greek
Adler, Bazin, Schiffer (1965)	-	-	-	greek
Anderson (1967)	-	-	- ^b	greek
Bergmann (1942)	-	- ^a	-	greek
Cartan (1946)	-	-	-	
Davis (1970)	-	+	-	latin
Eddington (1922)	-	+	-	greek
Ehlers (1971)	+	+	+	latin
Einstein (1950)	-	+	-	greek
Eisenhart (1926)	-	+	-	
Fock (1959)	-	- ^a	-	greek
Fokker (1965)	-	-	+	latin
Hawking and Ellis (1973)	+	+	+	latin
Hicks (1965)	-	+	+	
Infeld, Plebanski (1960)	-	+	-	greek
Lichnerowicz (1955)	-	+	+	greek
McVittie (1956)	-	+	-	greek
Misner (1969a)	+	+	+	greek
Møller (1952)	+	-	-	latin
Pauli (1958)	+	-	-	latin
Penrose (1968)	-	-	-	latin
Pirani (1965)	-	-	-	latin
Robertson, Noonan (1968)	+	+	-	latin
Sachs (1964)	$\pm$	+	+	latin
Schild (1967)	-	+	-	latin
Schouten (1954)	-	-	+	
Schroedinger (1950)	-	+	-	latin
Synge (1960b)	+	+	-	latin
Thorne (1967)	-	+	+	greek
Tolman (1934a)	-	+	-	greek
Trautman (1965)	-	-	-	latin
Weber (1961)	+	+	+	greek
Weinberg (1972)	+	-	-	greek
Weyl (1922)	-	+	+	latin
Wheeler (1964a)	+	+	+	greek

^aUnusual index positioning on **Riemann** components gives a different sign for $R_{\mu\nu\alpha\beta}$.

^bNote: his $\kappa < 0$ is the negative of the gravitational constant.

Lecture :

- - +

(like "Fokker (1965)")