

Additional corrections to *Introduction to Tensor Analysis and the Calculus of Moving Surfaces*, Part I.

- 1) Page 42, equation (4.44): All “A”s in denominator should be “a”.
- 2) Page 72, equation (5.84): The top index of both Christoffel symbols should be “phi” not “theta”. (Can be verified by computation; theta index gives 0.)
- 3) Page 81, second line from bottom: “The Kronecker symbol **is** [not **as**] a variant...”
- 4) Page 82, Exercise 89, second line: “More generally, generally show that....” (remove second “generally”)
- 5) Page 85, second paragraph, first line: “And so, we develop ... invariants: stick **to** tensors...” (add “to”)
- 6) Page 86, Exercise 99, second line: “components **of**  $V_{ij}$  with respect to...” (add “of”)
- 7) Page 86, Equation (6.47): Lower subscript of final Jacobian J should be k, not k with a bar over it.
- 8) Page 88, second sentence from last should read: “The upper part of the second slot, occupied by j, could also be marked...” (Commas added; otherwise, the meaning is weird: j is not occupying 2 slots.)
- 9) Page 89, (grammar/style), line below equation (6.62): “...is an object whose only nonzero value is” (replace “a” with “an”)
- 10) Page 91, sentence above equation (6.74): Last character should be “**Z**” not “Z”.
- 11) Page 92, first line: “We proved that some **of** the essential...” (add “of”)
- 12) Page 96: all of the “*Example xxx*” should probably be “**Exercise xxx**”. This looks like a leftover from an earlier format. There is no explanation or implied justification (e.g., solutions given immediately) as to why these are examples.
- 13) Page 97, equation (7.22): all of the  $\mathbf{e}_i$  are actually row vectors, transposes of the column vectors of equations (7.18) — (7.20). This should be indicated with a “T” superscript.

(It would be better to define  $\mathbf{E} = [\mathbf{e}_1 \ \mathbf{e}_2 \ \dots \ \mathbf{e}_n]$  and similar for  $\mathbf{E}'$  in (7.22), and have  $\mathbf{E}' = \mathbf{E}X$  in (7.21) and  $\mathbf{v} = \mathbf{E}v$  in (7.27). Then we would always be working with column

vectors. The author may have an important reason for using  $X$  as is instead of its transpose. If you have access to the author, you might pose this to him.)

14) Page 98, equation (7.32) should read:  $(u, v) = M_{ij} u^i v^j$  (the final superscript is “j” not “i”)

15) Page 99, line above equation (7.36): “that  $\mathbf{v}$  [not  $v$ ] is the image of  $\mathbf{u}$  under...”

16) Page 104, equation (7.73): last variable should be “ $x^i$ ” not “ $x^j$ ”.

17) Page 113, sentence following equation (8.45): This sentence is completely scrambled. Should probably read: “The vectors  $\mathbf{Z}_2$  and  $\mathbf{Z}_1$  are orthogonal, and the length of  $\mathbf{Z}_2$  equals  $r$ .”

18) Page 116, equation (8.13): should be labeled (8.9) The sentence above this should read: “We repeat equation (8.9).” (not (8.13))

19) Page 117, Exercise 136: first covariant derivative should read:  $\nabla_j \mathbf{T}_{ij}$  (first subscript of “ $\mathbf{T}$ ” is “i” not “j”.)

20) Page 122, equation (8.86): no question mark needed at end.

21) Page 137, (grammar/style) second paragraph, last sentence: “.. for which alternative definitions exist.” (everything is plural.)

22) Page 137, (grammar/style) first sentence of paragraph containing (9.20): “It is evident that delta systems are skew-symmetric in **their** upper and **their** lower indices.” (not “its”)

23) Page 138, equation (9.25): subscript of first Kronecker delta on the left should be “i” not “j”.

24) Page 138, Exercise 171, should probably read: “Justify equations (9.21) and (9.22).” (not “(9.21) and (9.25)”; this makes more sense in the context of the following exercises.)

25) Page 138, Exercise 172 and Exercise 173 should probably read: “Justify equations (9.23) **to** (9.25)...” (not “and”; it makes no sense to skip the middle one.)

26) Page 139, (grammar/style), Exercise 179, should read: “Show **the**  $C = AB$  property...” (add “the”)

27) Page 141, sentence after equation (9.47) should read: “The same two terms correspond **to** [not **not**] nonvanishing...”

28) Page 154, equation (9.124), first covariant derivative on the right should read: “ $\nabla_i \nabla^j U_j$ ” not “ $\nabla^i \nabla_j U_j$ ”

29) Page 155, (grammar/style), Exercise 209, should read: “Show that **the** divergence of **the** curl vanishes.” (add “the”)

30) Page 155, (grammar/style), Exercise 210, should read: “Show that **the** curl of **the** gradient vanishes.” (add “the”)

Additional corrections to *Introduction to Tensor Analysis and the Calculus of Moving Surfaces*, Part 1 - More

- 1) Page 59, paragraph after (5.20), “The complete proof of equation (5.20) is found in Chap. 6”. This is not found. Arc lengths are covered in more depth in Chapter 13, Section 4, which back-references this section.
- 2) Page 126, equation (8.116), left side should be:  $\nabla_{i'} T^{i'}$  (primed indices).

Additional corrections to *Introduction to Tensor Analysis and the Calculus of Moving Surfaces*, Part 2.

- 1) Page 165, line 1: “In combination with **(10.11)**,...” (Not **(10.11a)** )
- 2) Page 165, paragraph after (10.17): “Naturally, the ambient and surface covariant **metric tensors** are...” (not **bases**)
- 3) Page 169, (grammar/style), last line of paragraph after (10.46) is scrambled. Should read “From this form, it is evident that the eigenvalues of  $P$  are 0 and 1.” (Stylistically, 0 may be distracting here as it is a trivial eigenvalue, with zero eigenvector, of every equation. Also, degenerate eigenvalues are referred to singly.)
- 4) Page 170, Exercise 217: “To show **that  $\mathbf{V} - \mathbf{T}$**  is orthogonal...” (not  **$\mathbf{V} - \mathbf{T}$  that**).
- 5) Page 176, (grammar/style), sentence in middle of last paragraph: “The word deformation refers...surfaces, and the...” (comma added; compound sentence).
- 6) Page 180, equation (10.109):  $z(\theta, \phi) = r \sin \phi$  (not  **$R$** ).
- 7) Page 183, (grammar/style), Exercise 226: “Show that...the above **expressions simplify** to the following.” (not **expression simplifies**).
- 8) Page 187, (grammar/style), Exercise 233: “Show that **the** surface Laplacian **for the** sphere...”. Similar for Exercises 234-236 on the next page.
- 9) Page 191, (grammar/style), sentence after (11.25): “This identity suggests the definition”
- 10) Page 192, (grammar/style), equation (11.39). First Kronecker delta should have  $r$  in subscript instead of  $j$ , to match convention.
- 11) Page 194, equation (11.49), right side should be “ $-Z^{aj} B_{a\beta}$  ( $j$  index in superscript position).

12) Page 200, (grammar/style), sentence below (11.20): “**We** introduce the Riemann-Christoffel...” (add **We**).

13) Page 203, (grammar/style), first line: “where  $S^\delta$  is an *arbitrary* variant.” ( $\delta$  in superscript, not  $\omega$ . This matches prior and subsequent use.)

14) Page 209, (grammar/style), paragraph after (12.64): “Also note the term  $\mathbf{NB}_{\alpha\beta}V^\alpha V^\beta$ , known as the *centripetal acceleration*.” (Comma added; appositive phrase.)

15) Page 209: Remove “**Exercise 262.**” This paragraph was probably formatted incorrectly.

16) Page 224, (grammar/style), Exercise 285: “...normal, binormal, curvature, **and** torsion...” (add **and**)

17) Page 240, equation (14.16): change “ $|J|$ ” to “ $J$ ”, as in (14.17). Absolute value not necessary as orientation-preserving coordinate change has already been specified.

18) Page 245, (grammar/style), line below equation (14.45): “and **to** the contour normal  $\mathbf{n}$ ” (add **to**. This is a new phrase.)

*Additional corrections to Introduction to Tensor Analysis and the Calculus of Moving Surfaces. Index.*

Correct:

Arc length, **59**, 216, 218, 222

Shift tensor, **164**, 228

Add:

Metrical Property, 112, 120