

Errata for Lai, Rubin and Krempl, Introduction to Continuum Mechanics, 4th Ed.

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These errata concern the following text:

W.M. Lai, D. Rubin and E. Krempl, *Introduction to Continuum Mechanics, 4th Ed.* (Butterworth-Heinemann/Elsevier, Amsterdam, 2010)

The printer's key on the copyright page is as follows:

09 10 11 12 13 10 9 8 7 6 5 4 3 2 1

The items listed below are things I just happened to notice while reading through the book. Most items are very minor, being issues of typography or grammar, but some items do refer to actual errors (at least I *think* they are errors). In a book containing perhaps 4,000 equations, it is amazing that there are so *few* errata! I sent this list to Prof. Lai who graciously replied saying he will incorporate these items (at least the ones that really are errata) into the next printing if that is feasible.

Chapter 2

p 38 4th line of text from bottom: "at least three real eigenvectors"

Normally one thinks of there being exactly three normalized eigenvectors of a real symmetric matrix. This "at least" phrase perhaps refers to the fact that, if two or more eigenvalues are the same, there is freedom in setting the eigenvectors corresponding to those eigenvalues, since any linear combination of those eigenvectors is also an eigenvector.

Chapter 3

p 103 Ex 3.16.2 4th line of text: "Thus, the existence of a single-valued ..." ("a" is missing)

Chapter 4

p 159 Eq. (4.4.1) second line should say $-(T_{12}+\Delta T_{12})$ and not $+(T_{12}+\Delta T_{12})$

p 174 Sec 4.10 first line normally one might say "The Cauchy stress tensor is defined..." ("The")

p 181 Eq. (4.12.3) the two occurrences of x_j should be replaced by x_j

p 182 Eq. (4.13.7) the second occurrence of "tr" should be deleted

p 189 Eq. (4.18.18) the sign before the second integral should be $-$, not $+$ (see previous equation)

Chapter 5

- p 236 4th text line up from bottom "Indeed, on the face $x_1 = \ell$..." (not "faces")
- p 255 text line after Eq. (5.22.5) the semicolon after $-(v/E_Y)(T_{11}+T_{22})$ should be a comma
- p 260 2nd line text up from bottom "The function $\phi_m(x_1)$ will now be..." (not $\phi_m(x_2)$)
- p 277 Eq. (5.35.7) The $T_{\theta\theta}$ equation (only) should have $-\tau$ in place of τ
- p 277 Eq. (5.35.10) The $T_{\theta\theta}$ equation (only) should have -1 in place of 1 (same idea as above)
- p 278 Section 5.37 title Should say "THE FLAMANT PROBLEM" (not FLAMONT)
- p 282 top line (b) equation reference should be (3.7.20) and not (3.37.20)
- p 299 1st line text "Corresponding to which, the stresses are..." seems a non-sentence. Maybe delete period after (5.43.1) and say "corresponding to which the"
- p 299 Eq. (5.43.4) the ψ symbol should be bolded to match \mathbf{e}_z (as at top of page)
- p 328 Eq. (5.52.2) E should be E_Y
- p 342 Eq. (5.59.1) should read $x_1 = \lambda_1 X_1, x_2 = \lambda_2 X_2, x_3 = \lambda_3 X_3, \lambda_1 \lambda_2^2 = 1$ (capital X's as shown)
- p 343 in drawing lower case k should be upper case K to match the previous equations
- p 351 2nd line text "Now, since the eigenvectors of \mathbf{T} ..." is a non-sentence. Perhaps replace with "The eigenvectors of \mathbf{T} coincide...".

Chapter 6

- p 364 Eq. (6.8.1) The = sign in front of the second line should be a + sign (similar to 6.8.2)
- p 381 first line of equations: the third equation should read $v_3 = 0$ (not $v_2 = 0$)
- p 399 mid page "A. The Case of a Divergent Nozzle". This should say "Convergent Nozzle", as indicated by the drawing on the next page.
- p 400 text line after (6.30.5) Probably the in-line quote of equation (6.30.2) was not intended.
- p 403 first line Equation reference should be (6.31.10) and not (6.30.10)
- p 403 line above (6.31.12) Equation reference should be (6.31.10) and not (6.30.10)

Chapter 7

- p 415 Eq. (7.2.14) integral should be $\int_{\mathbf{s}} \mathbf{x} \times \mathbf{t} \, d\mathbf{S}$ (not $\int_{\mathbf{v}}$)
- pp 418-419 in 7 places, want integration domain to be $V_{\mathbf{m}}(t)$ and not $V_{\mathbf{m}(t)}$ (typesetting issue)
- p 420 Eq. (7.5.2) differential dV is missing from left side of the equation.
- p 426 Ex. 7.6.2 water jet mysteriously curves slightly before and after hitting the vane
- p 427 4th line of text "unit width in z direct ion" should be "direction" (no space before ion)
- p 429 Eq. (7.7.11) second line, in the middle integral v should be bolded [as it is in (7.7.10)]
- p 430 Eq. (7.8.1) second line, first F subscript should be written F_2 (as later in that line)
- p 431 Eq. (7.9.9) the addition of (7.9.9) to the left side of (7.9.8) accounts for fictitious moments as long as $\mathbf{R}_0 = 0$ (see drawing on page 428).
- p 434 2nd line equation reference should be (4.15.5) and not (4.15.4) (for the vector form)
- p 434 Eq. (7.10.10) second line, first term integrand should be $\frac{\partial}{\partial t} [\rho (\frac{v^2}{2} + u)] \, dV$ (ρ inside)

Chapter 8

- p 468 Eq. (8.11.6) The quantity ds should be replaced by ds^2 in the three places it appears
- p 473 4th line of text "Since..." before semi-colon is a non-sentence. Replace "; therefore" by comma.
- p 475 9th line text up from bottom Same as above. Replace "; therefore" by a comma.
- p 479 Eq. (8.17.8) The last term of the ϕ_2 equation should be $-2\dot{\mathbf{c}}$ and not $-\dot{\mathbf{c}}$.
- p 479 Eq. (8.17.9) Since $(C_{\mathbf{t}})_{12}(s) = -ks$ in (8.17.5), and since $\mathbf{C}_{\mathbf{t}}(t-s)$ appears in (8.17.1), S_{12} in (8.17.9) should depend on t . Then with $t = 0$, the overall signs in both equations in (8.17.9) are wrong and this propagates into (8.17.10).
- p 480 Eq. (ii) On the far right, replace $ds/d\tau$ by $d\mathbf{s}d\tau$ (slash should not be there)
- p 481 Section A title: Complexity n should be replaced by Complexity N , since N used below.

p 483 Sec 8.19 2nd line text: "Taking material derivative.." should be "Taking the material derivative.." (as appears on the next line of text)

p 483 Eq. (8.19.2) In the middle term on the right side T should be bolded \mathbf{T} (as in other 2 terms)

p 484 Eq. (8.19.9) the = sign should be \equiv , then consistent with (8.19.19) and (8.19.26)

p 486 Eq (ii) " $\sin^2\omega t/2$ " should be $[\sin(2\omega t)]/2$ in both matrix locations

p 486 Eq (iii) " $\cos^2\omega t$ " should be $\cos(2\omega t)$ in both matrix locations

p 498 Eq. (8.24.3) $= \frac{r d\omega}{dr}$ would more normally be written as $= r \frac{d\omega}{dr}$