

VECTOR CALCULUS, LINEAR ALGEBRA, AND DIFFERENTIAL FORMS:
A UNIFIED APPROACH

More notes and errata for the 3rd edition

Posted March 23, 2008

Many thanks to

Travis Allison, Thomas Madden, Richard Palas, and Lewis Robinson

for their contributions to this list

Mathematical errors

PAGE 275 The augmented matrix in the margin should be

$$\left[[\mathbf{D}_p \mathbf{F}(\mathbf{c})] \mid -[\mathbf{D}_{np} \mathbf{F}(\mathbf{c})] \right].$$

PAGE 523 In the second margin note, “ (r, φ, θ) -space” should be “ (r, θ, φ) -space” and “ (φ, θ) -plane” should be “the (θ, φ) -plane”.

PAGE 627 Second paragraph of the margin note: “if φ is a 0-form, then $d\varphi$ is a 1-form”, not “... then $d\varphi$ is a 2-form”

PAGE 637 Line before equation 6.9.21: “steady current”, not “current”

PAGE 638 There are two errors in the right side of equation 6.9.25: the grad should be $-\text{grad}$ and the exponent in the denominator should be 1, not 2:

$$\frac{\overrightarrow{\mathbf{x} - \mathbf{y}}}{|\mathbf{x} - \mathbf{y}|^3} = -\text{grad} \frac{1}{|\mathbf{x} - \mathbf{y}|},$$

PAGE 675 In equation A1.3, the inf should be over $l \leq -k$, not $l \geq k$. Or, one could keep $l \geq k$ and change the other l 's in the formula to $-l$'s.

Other errors and miscellaneous notes

PAGE 3 First margin note: “ n terms”, not “ nt terms”

PAGE 17 Note that real numbers are actually bi-infinite decimals with 0's to the left: a number like 3.0000... is actually

...00003.0000....

By convention, leading 0's are usually omitted (one exception being credit card expiration dates: to an issuing bank, March is 03, not 3).

PAGE 38 The last margin note should be on page 39.

PAGE 173 Line 16: “then the set of equations will have no solutions”, not “ then the solution will have no solutions”

PAGE 189 In a future edition, we will add the comment that the zero vector space whose only element is the vector $\vec{0}$ has only one basis, the empty set.

PAGE 213 First margin note: “preserving whatever structure is relevant”, not “preserving whatever structure is relative”

PAGE 219 In the caption for figure 2.6.1, $\frac{2}{3} = \frac{5}{-1}$ should be $\begin{pmatrix} 2 \\ 3 \end{pmatrix} = \begin{pmatrix} 5 \\ -1 \end{pmatrix}$.

PAGE 223 Sentence before equation 2.7.3: “to compute the powers”, not “to computer the powers”

PAGE 245 Last margin note: “a unique solution”, not “one unique solution”

PAGE 282 Last line of exercise 2.31: “A for all”, not “Afor all”. Exercise 2.33: “What should you do? Suggest ways to deal with the situation”, not “What should you do? ways to deal with the situation”.

PAGE 303 Exercise 3.16 “in example 3.1.13”, not “In example 3.1.13”

PAGE 308 Last line of text: “the equations we have been given”, not “the equations we have given”.

PAGE 318 Third margin note: It would be clearer to write “first partials” rather than “partials”: “Our hypothesis that the first partials be differentiable”.

PAGE 415 In the first margin note, the first line of the equation should have an extra set of parentheses: $E((f - E(f))^2)$, not $E(f - E(f))^2$.

PAGE 472 “Clearly if A is an $n \times n$ matrix”, not “... an $n \times n$ polynomial”

PAGE 514 Margin note for exercise 4.11.18: “Part a” should be “Part b”

PAGE 594 In the remark, what we call “units”, physicists would call “dimensions”. Physicists use “dimension” to describe what is being measured, as opposed to units. A force field might be measured in joules/meter or ergs/centimeter; both correspond to “dimensions” energy/length. Other cases where we use “units” rather than “dimensions” are found on pages 595, 596, 636, 640.

PAGE 601 Last line before the exercises: “We explore this further in section 6.9”, not in section 6.8

PAGE 633 2nd paragraph of margin note: “better suited to insects than to people”, not “... that to people”

PAGE 634 In a subsequent edition we will add the note

The vector fields $\vec{\mathbf{E}}$ and $\vec{\mathbf{B}}$ are functions of x , y , z , and t , but the operators div and curl take derivatives only with respect to the spatial variables. Maxwell's equations as written in equations 6.9.2-6.9.5 treat space and time in different ways, and make it difficult to work in spacetime, for instance, to pass from one frame of reference to another with respect to which it is moving. By contrast, the formulation 6.9.14 of Maxwell's laws in terms of differential forms treats space and time on an equal footing.

PAGE 639 Three lines after equation 6.9.33: "Ampère's k_2 ", not "Maxwell's k_2 ".

PAGE 662 Exercise 6.11.16 should really be in section 6.9 or with the review exercises for chapter 6.