

Spivak's *Œvre*

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Abstract

Spivak's *The Joy of T_EX* and *L^AM_S-T_EX—The Synthesis*, are discussed.

1 Introduction

To my knowledge Spivak's work comprises the books *The Joy of T_EX*, *L^AM_S-T_EX—The Synthesis*, and his Wizard's manual. Next to D_EK's books these are the best documented books/manuals of $\langle X \rangle$ T_EX implementations, I have seen. As should be the case with books which have passed some barriers the *quality* of the material is not the issue,¹ but more the relevancy, the intelligibility and the functionality compared to plain. Some numbers: plain is in the T_EXbook 483p. and manmac comprises 12p, 'The Joy of T_EX' another 290p. (no macro listings), *L^AM_S-T_EX*, again 290p. (no macro listings either).

1.1 Dependencies

A_MS-T_EX has been commanded by the American Mathematical Society (AMS). It is not a proper extension to plain. D_EK supervised the project. It is another T_EX variant, like L^AT_EX is. *L^AM_S-T_EX* builds upon *A_MS-T_EX* and provides L^AT_EX functionalities except for the picture environment, Spivak claims that it is less verbose than L^AT_EX. The file `amstex1.tex` is needed to run *L^AM_S-T_EX*. *L^AM_S-T_EX*'s table modules seem to be independent of *A_MS-T_EX*; I don't know whether the commutative diagram macros are. All the programs are in the public domain.

2 *A_MS-T_EX—The Joy of T_EX*

The book consists of 3 parts: Starters (\approx 50p), Main courses (\approx 70p), and Sauces & Pickles (\approx 75p), complemented with 10 appendices (\approx 75p).

It is meant as an independent extension to T_EX, and to the T_EXbook. A consequence is that no references to the T_EXbook are made, which I pity. The design is at least 10 years old. Moreover, the introduction says that 'You can remain blissfully ignorant of the complicated rules that typesetters have developed for the proper setting of mathematics formulas—T_EX knows them all.'

Well, that is not true. An author or typist *cannot* remain blissfully ignorant, as is among others proved by the example on the next pages: explicit kernings and context dependent parentheses are used. Knowledge of typesetting in general and typesetting of mathematics in particular, remains necessary. A reference to Swanson (1986) should have been made. Moreover, I don't consider the approach realistic: *A_MS-T_EX* users should at least be T_EX users. The abstraction from formatting into procedural mark up—although to be recommended in general—goes so far that the basic concepts of T_EX: boxes, glue and penalties, are not explained. It is even stated at p123 '`\h(v)box` isn't a control sequence that you are ever supposed to use—it is a control sequence that T_EX uses internally in all sorts of important ways.' I don't agree with the one-sidedness of the made choices, especially because it is overlooked that typists also need to get the T_EXscript correct, that is, it has to pass the parser, and proofs have to come out, that is with use of the right fonts. There is no doubt about it that the error messages, and unawareness of the font selection schemes will cause trouble. Now and then the book says: '*A_MS-T_EX* tries . . .', while it should have been '*T_EX* tries . . .'.

2.1 First part: Starters

Basic *A_MS-T_EX* processing, and the use of `\amsppt` style (the preprint style), constitute part 1. A nice getting started section. Some quibbles, however. Especially in relation to *L^AM_S-T_EX*, the use of double quotes for quotations makes me realize that people change minds, and Spivak in particular.² What I missed with respect to spacing is the good habit to terminate a number by a space or `\relax`. Furthermore it is a white lie (p5) that curly braces can't be replaced by control sequences. Indeed not *all* occurrences can. I presume that `\bgroup` must be kept hidden for the user as well? In the subsections about spacing I missed the example `\TeX` itself. Spaces, trailing and the spurious ones, remain puzzling. That replacement texts *don't*

¹ And indeed let there be no doubt about it: the quality is very good!

² The more so when in the *L^AM_S-T_EX* manual double quotes are used for a quotation, p187.

neglect spaces is well demonstrated among others by the exercises 19.3, .26, and .27.

2.2 Second part: Main Courses

This section constitutes what it is all about: to simplify the inputting of math.

Nowhere it is proofed or made acceptable in some way that the provided macros are better or easier to use. The macros are mainly different from plain's. In general terms the section is well-done. In exercise 8.10, I don't like the use of the multiplication dot.³ When it is mentioned that no `\par-s` are allowed in display math mode, a note about blank lines would have been appropriate too.⁴ In section 10 it is stated that the instructions `^`, and `_` apply only to the next single character. A white lie: it applies to the next token or group, in plain at least.

I don't like to be carried away by \TeX 's power. To become a bit loose about the good habit to choose as simple representations as possible, because of \TeX 's power is counter productive with respect to getting across what an author is up to. This holds for division representations, complicated exponents without use of `\exp` (there is also the spacing pitfall in the exponents), and complicated 'limits' to summation and integration symbols. Swanson advises to define names for complicated constructs and to use these names.

I don't like the heavy braces on among others the pages 103, 104, 106, 110, 111, 116.

Much functionality of \TeX has been renamed on the one hand while on the other hand some functionality has been altered under the same name. This makes an $\mathcal{A}\mathcal{M}\mathcal{S}\text{-}\mathcal{T}\mathcal{E}\mathcal{X}$ script incompatible with plain.⁵ Some names? For plain's infix command `\over`, there is the prefix command `\frac`. `\align`, `\aligned`, `\alignat`, `\split`, `\multiline`, and `\gather` with their `\end...` endings, add to plain's `\eqalign`, `\eqalignno`, and `\displaylines`. Moreover, there is `\tag` superseding `\eqno`. Different names, different syntaxis but no increased functionality. All the given formulas could have been typeset by \TeX with roughly the same level of *discrepancy* between the *math copy and the \TeX script*. Then we have instead of `\matrix`, and `\pmatrix`, the substitutes `\bmatrix`, `\vmatrix`, `\pmatrix`, `\Vmatrix`, and `\smallmatrix`, while the powerful and practical `\bordermatrix` disappeared from the stage, I mean is not mentioned at all. At the definition front there is `\define`, `\redefine`, and `\predefine` as substitutes for `\def` and `\let`. (No replacement of the \TeX nical `\futurelet`, of course.) `\edef` etc. disappeared as such. In

`\accentedsymbol` it is used from the application viewpoint. This holds for some other \TeX macros (or control sequences) too: `\overfullrule=0pt`, `\cr`, `\openup`, `\noalign`, `\phantom`, `\atop` and the like, `\vbox{\hsize=...}`, `\cal`, `\dots`, `\oldstyle`, `\hoffset`, `\voffset`, `\vadjust`, and the abbreviation period.

Next some examples of the same names but different functionality. `\item` has been redefined within the `\roster` environment. I personally love plain's `\item`; happily Appendix C reassures me that it can still be used as such. In that Appendix the different use of `\footnote`, `\proclaim` and the different attitude with respect to font changes are explained as well.

2.3 Third part: Sauces and Pickles

It starts with shorthand definitions, mainly to support typing efficiency. The example on p127, is very suited within the context, but horrible from a publishing math viewpoint, and inefficient with respect to the paper used. A waste of paper, not compensated by anything!⁶ The final part is an alphabetic enumeration of 'everything else.' Rich in nature, but a bit out of balance with respect to the earlier attitude. The `\struts` are hidden here, although they are very useful and common in practice.

2.4 Appendices

The collection of exercises is rich. The input format of bibliographies still does not pay enough attention to abstraction of interpunction and to abstraction of the order in which the information must be supplied. Appendix C explains in detail how to use plain and $\mathcal{A}\mathcal{M}\mathcal{S}\text{-}\mathcal{T}\mathcal{E}\mathcal{X}$, that is, plain commands as well as $\mathcal{A}\mathcal{M}\mathcal{S}\text{-}\mathcal{T}\mathcal{E}\mathcal{X}$'s. I guess that Appendix F about Future fonts is outdated and reality by now.

2.5 Conclusion

A wealth of material from a user point of view is provided, ready to use. I personally pity the confusion which it will bring, because no more functionality has been provided, nor is the task of typists relieved. Many more names along with modified syntaxes have been introduced. As a self-publishing author I will stay with plain and use published and reviewed macros as extensions. Not the complete superseding collections. However, I will not refrain from using $\mathcal{A}\mathcal{M}\mathcal{S}\text{-}\mathcal{T}\mathcal{E}\mathcal{X}$, nor will I refrain from using $\mathcal{L}\mathcal{A}\mathcal{T}\mathcal{E}\mathcal{X}$, if the publication at hand can be handled more effectively by those tools.

³Of course it is unnatural to tell a typist to type `\ ,` but a `\mulspace` could have been defined with that functionality.

⁴The more so because people are used to insert blank lines and outside math mode extra blank lines are simply ignored. So, a double warning is in place.

⁵Agreed, the reader is warned for those occurrences in Appendix C.

⁶We should conform to reality: editors love to squeeze unnecessary space.

3 L^AM_S-T_EX

This book also consists of 3 parts: Basic document preparation (≈ 120 p.), Fancy mathematics (≈ 53 p.), and Tables (≈ 84 p.). The contents is somewhat unbalanced. The basics what *everybody* should know and adhere to, then the very specialized and advanced commutative diagrams for homologists or their colleagues, and finally the in depth treatment of formatting tables. The beginner, the math specialist, and the advanced table formatter. A broad audience.

3.1 Part 1: Basic Document Preparation

Perhaps inspired by the success of L^AT_EX, L^AM_S-T_EX starts with a section about basic document preparation. A very strong point in my opinion is the general mechanism for automatic numbering and symbolic referencing. Very strong, and I hope this can be used as a separate package. It competes with AMS-L^AT_EX and L^AT_EX. Apparently, the users and macro writers agree upon the need for these kinds of things. So it is relevant!

But, . . . , I missed the style options. What about 2(and more)-columns⁷? What about other sizes of the paper, a4.sty, for example? What about language flexibility? From section 6 we get that the names, such as Chapter or the similar name in another language is left to the style files. So L^AM_S-T_EX is not enough! A bit out of the blue are the *plain* macros on p.73. A novelty, well a revival, is that footnotes start with number 1 on each page.

3.2 Part 2: Commutative Diagrams

The examples look quite complex. The language and notation look sensible. But I'm not a homologist. And leave this for whatever it is worth, keeping in mind, if ever I would need to typeset CD's, I will certainly return to this section.

3.3 Part 3: Tables

The tables part consists of modules, which can be run separately from the main part of L^AM_S-T_EX.

3.3.1 Processing

Tables have to be T_EXed separately from the main document. In the main document (floating) space has to be specified and processed. The merging can be done at the dvi-level.

The merging of the tables into the main document goes in two steps. First—in the main run—enough space is reserved to paste the table in the appropriate place. This can be done in the 'floating way.' Next at the dvi-level the tables are pasted in. Advanced, and very powerful. Hi-T_EX!

With respect to the notation it is remarkable that curly braces are never used to enclose table dimensions. Is

that really easier, once one has adopted the curly braces mania? I doubt it, just confusing. I was some years ago confused by L^AT_EX's inconsistency at this point, especially with respect to the deviating conventions adopted within the picture environment, not to mention the separators of the `\item` parameter.

The section is well done, and it contains a wealth of material. It is not a surprise that a new syntax is used throughout. The table on p.201, is realistic, with a header part and 'halfines.' I pity that the 'h' is not vertically centered. A little further a table with Side SpecificationS is given, similar to the bordered matrix idea.⁸

Around p.232 row spans—called crossing rows—are introduced. The table has 3 logical columns, but the markup needs 5 columns. I mean the user deals with a 3 column table while in the mark up *he* has to think in terms of a 5 column table. Still a discrepancy between the logical mark up, and the formatting. P.234 formats complicated headers. But again, how many columns are formatted? According to the formatting 6, but logically 3, in my opinion. This remains confusing. The 3*3-table on p.235, with a 2*2-subtable/block in the left upper corner, is a nice challenge for table programs which claim to be able to format row spans and column spans, simultaneously. The table is symmetrical along the main diagonal, but the formatting is not symmetrical at all. It takes 9 rows and 3 columns!

At the end notes and footnotes to tables are treated. Moreover, the rules can vary in length and thickness. Very powerful!

What I missed is typesetting of simple tables with hardly no mark up information provided by the user. No need for a preamble, and no need for `&-s` and `\cr-`; just spaces and carriage returns as separators. Similar to Cowan (1985).

3.4 Conclusion

L^AM_S-T_EX is certainly up-to-date with some very powerful features. It combines basic mechanisms like general automatic numbering and symbolic referencing with advanced and esoteric commutative diagrams. A bit out of balance. The table macros are very powerful, but not simple to use. I missed the class of simple tables, and the tables which extend the page.⁹ Both do occur in scientific publishing.

4 Some afterthoughts

How come that at the time of the birth of the lxxiii project, 1989, L^AM_S-T_EX appeared, and that there is no cooperation? The weaknesses of L^AT_EX, which L^AM_S-T_EX has tried to overcome—which are also the targets of lxxiii—will be reprogrammed from scratch. It sounds

⁷ Agreed, math papers generally don't take 2 or more columns.

⁸ The SGML community talks about row stubs.

⁹ Mentioning portrait and landscape as variants to be handled at the driver level would have been nice.

like a gigantic waste of energy. And this is not the only effort in that direction. Cooperation remains apparently difficult. Perhaps we should be more modest in the spirit of Rogers¹⁰

‘It’s also unfortunate that Dr Spivak, as well as many others, choose to embed macros of this nature in large packages such as \LaTeX , \AMS-TeX , \LaTeX , etc. I would rather see them made available as self-contained modules that can be easily incorporated into macro packages designed to accomplish specific purposes.’

I completely agree with that attitude.

References

- [1] Cowan, R.F. (1985): `Tables.tex` (from the file server).
- [2] Spivak, M.D. (1986): *The Joy of \TeX* , AMS, ISBN 0-8218-2999-8 (second printing).
- [3] Spivak, M, D. (1989): *\LaTeX The Synthesis, \TeX plorators*. 3701 W. Alabama, Suite 450–273, Houston, TX 77027.
- [4] Swanson, E. (1986): *Mathematics into type*, AMS, ISBN 0-8218-0053-1. (reprinted).

¹⁰Quoted from *On Contrarian Views*, \TeX line 14.