

AfM user guide for *Arkiv för matematik*

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Contents

1. Introduction	2
1.1. Final preparation	2
1.2. Changes	2
1.3. Abstract	2
1.4. Colour figures	2
2. TeXnical instructions	2
2.1. Additional options to <code>\documentclass</code>	3
2.2. Self-defined macros	3
2.3. Packages	3
2.4. Figures	4
2.5. Tildes, hats, bars, checks, breves, and vecs	4
2.6. Commutative diagrams	4
2.7. Theorem-like environments	4
2.8. Linebreaks	4
3. Typographical instructions	5
3.0.1. Authors' names	5
3.1. Language	5
3.1.1. Spelling	5
3.1.2. Abbreviations	5
3.1.3. Denote	6
3.1.4. Italic correction (<code>\V</code>)	6
3.2. Mathematical expressions	6
3.2.1. Parentheses	6
3.2.2. Sets	6
3.2.3. Fractions	7
3.2.4. Integrals, sums, unions, intersections and differentials	7
3.2.5. Sequences and matrices	8
3.2.6. Elementary functions	8
3.2.7. Operators	8
3.2.8. <code>\notin</code> (\notin)	8
3.2.9. <code>\forall</code> (\forall) and <code>\exists</code> (\exists)	9

3.2.10. $\backslash\cdot (\cdot)$	9
3.2.11. Norms	9
3.2.12. Restrictions	9
3.2.13. i and ℓ	9
3.2.14. Mappings	9
3.2.15. Proofs and \square	9
3.3. References	10
3.3.1. Spelling of names	11

Section 1 was written by Institut Mittag-Leffler, Section 2 by LE- \TeX , and Section 3 by Anders Björn.

1. Introduction

1.1. Final preparation

To prepare the final files of your accepted paper for *Arkiv för matematik* (*AfM*) open the **afm-template.tex** file, and use it as the basis for your article. (You will also need to have the other files of this package available.) Rename the tex file with the surname (in small letters) of the (first) author of your paper. Please follow the instructions given in the template file and in this user guide as close as possible.

1.2. Changes

N.B. Changes other than typographical must be approved by the editor in charge.

1.3. Abstract

Please add an abstract at the beginning of your paper. It will also be generally available on the Springer website for *Arkiv för matematik*. Therefore the abstract should make sense without the rest of the paper (e.g. rather than referring to say [3] it is desirable to write out the reference data in full).

1.4. Colour figures

AfM standard is figures in black and white (grey scales). If you wish to have figures printed in colour, you have to be prepared to pay for the extra printing cost. In the online version colour figures will appear free of charge.

2. \TeX nical instructions

The AfM-SVJour document class is purpose-built for the typesetting of *Arkiv för matematik* (*AfM*) due to the special and careful layout rules of this journal.

It is a modification (and in some parts an enhancement) of Springer’s SVJour document class.

The intention of the preparation of this special document class is to avoid extensive changes during the typesetting process. It should also help to reduce the number of potentially resulting errors.

This section contains some basic instructions, of T_EXnical nature, to be taken into consideration when adapting a paper to the AfM-SVJour document class. The instructions here complement those given in the template file.

Section 3, the layout part, gives a detailed description of some of the typesetting rules for *Arkiv för matematik*.

2.1. Additional options to `\documentclass`

The following list contains the (non-standard) options to `\documentclass` with a short description.

numbook all counters are of the structure “section.counter”

numbookfigure all figure counters are of the structure “section.counter”

numbooktable all table counters are of the structure “section.counter”

envcountsect all theorem-like-environment (in short: theorem) counters are of the structure “section.counter”

envcountsame uses one counter for all theorems

envcountreset resets the theorem counter(s) every new section

envcountsubsectreset resets the theorem counter(s) every new subsection

envcountsubsubsectreset resets the theorem counter(s) every new subsubsection.

Please also note that the option `envcountsect` disables the counter resets.

2.2. Self-defined macros

Please do the typesetting without self-defined macros that use non-standard fonts, change font sizes to non-standard values or construct terms in a non-*AfM* standard way. If these macros do not fit the *AfM* standards they have to be replaced by the typesetter.

2.3. Packages

Please reduce the number of added packages to a minimum. They also have to be replaced if they do not fit the *AfM* standard. If additional packages are used please make sure that all file(s) are enclosed. The packages `amsmath`, `amssymb` and `xypic` are included by default and do not need to be submitted.

2.4. Figures

Figures should be submitted separately as encapsulated postscript (.eps) files. Please use `\includegraphics` to embed figures.

For colour figures see also Section 1.4.

2.5. Tildes, hats, bars, checks, breves, and vecs

Please use `\tilde`, `\hat`, `\bar`, `\check`, `\breve`, and `\vec` to typeset these accents in mathematical expressions. Their sizes will be adjusted automatically according to the *AfM* layout rules. If the size of some accents is not correctly displayed on your system, please leave it unchanged. Due to font size differences discrepancies are possible in exceptional cases. The accent size will be displayed correctly at the typesetter's.

2.6. Commutative diagrams

Due to the *AfM* rules all commutative diagrams are to be typeset using the XY-pic package of Kristoffer H. Rose. Commutative diagrams typeset with other packages will have to be reprocessed.

The XY-pic package is available at <http://www.ctan.org/tex-archive/macros/generic/diagrams/xypic/>

2.7. Theorem-like environments

The following theorem-like environments are predefined:

- theorem
- claim (*)
- proof (*)
- case
- conjecture
- corollary
- definition
- example
- exercise
- lemma
- note
- problem
- property
- proposition
- question
- solution
- remark

(*) Unnumbered.

2.8. Linebreaks

Please do not insert linebreaks in the text parts manually. Due to minimal differences in the font sizes the layout of your paper will not always be exactly the same at the typesetter's. Except for multi-line equations, all manually inserted linebreaks will be removed. If it is necessary to avoid linebreaks to ensure the correct meaning of a term, then the use of `\hbox` is recommended.

3. Typographical instructions

Some of the comments below are more difficult to take care of than others. All authors should make sure that they comply with the instructions on references in Section 3.3. As for the other instructions, we do not expect all authors to fully comply with all of them, but we do expect all authors to do their best (without having to consult other sources of information).

When typesetting a paper a major concern should be to help the reader by giving it high readability. An important part is that the notation should be consistent. One should not, e.g., mix $e^{i\alpha}$ and $e^{\alpha i}$, unless there is a clear reason for their distinction.

Another important aspect is not to write in an atypical way (such as using strange wording or notation), so as not to draw the reader's attention away from the main purpose of the text.

3.0.1. Authors' names

In *AfM* we insist on writing at least one first name in full for every author of a paper. Initials may be given for other first names.

3.1. Language

In *AfM* we publish papers in English, French and German. The comments in this section primarily concern papers in English.

3.1.1. Spelling

In *AfM* we accept both American and British spelling. The spelling should be consistent throughout (this is a more common problem with joint papers). For instance do not mix non-linear and nonlinear (both are acceptable).

The authors of papers in French should note that these papers do not get the same kind of language check during the typesetting process, so these authors have an even larger responsibility of writing a good language with correct and consistent spelling.

For the spelling of names see Section 3.3.1.

3.1.2. Abbreviations

Such standard abbreviations as e.g., i.e., viz., and the mathematical standard abbreviations a.e. and a.a. may be used without explanation. On the other hand to write, e.g., PDE, ODE or psh (for plurisubharmonic) without any explanation is not acceptable. If such abbreviations only occur a few times they should be replaced by their meaning, otherwise an explanation should be given, usually on the first occurrence, e.g.

“... second order ordinary differential equations (ODEs) describe ...”.

When abbreviations such as i.e., e.g., viz., a.e., q.e., etc., are used one should make sure that the final period is *not* an end-of-sentence period (unless it really ends a sentence). The problem is only if the final period is followed by a space as e.g. here, which was typeset as `e.g.\ here`.

3.1.3. Denote

A common mistake in the mathematical literature is to use *denote* incorrectly. It is not acceptable to write “denote $X=A\cup B$. A correct use of denote is seen in “let X denote the union $A\cup B$ ”.

3.1.4. Italic correction (\backslash)

In certain situations one has to insert italic correction (\backslash) manually. If one uses `\emph` whenever something is emphasized in normal text, then one almost always only has to look at theorem-like structures and detect formulas within them starting with an upright character, which necessitates an italic correction before it, e.g. in “*Let A be a subset of \mathbf{R} .*” This was typeset as `Let A be a~subset of\ \mathbf{R}` .

Note that no italic correction needs to be inserted after “.” and “,”, and one can also survive without inserting them on low characters such as “a” and “e”.

3.2. Mathematical expressions

3.2.1. Parentheses

There are many types of parentheses available `()`, `[]`, `{}`, `\langle\rangle`, etc. Most of these have special meaning, e.g. when defining a set we use `{}` (see Section 3.2.2). Due to the special meaning of `{}` in many situations, in *AfM* we accept only `()` and `[]` for usage as ordinary parentheses with no special meaning.

To increase readability in *AfM* we insist on avoiding unnecessary parentheses, e.g., instead of

$$(f(x))^2 \quad \text{and} \quad a/(bc)$$

we write

$$f(x)^2 \quad \text{and} \quad a/bc.$$

Please do *not* use `<` and `>` as parentheses, use `\langle` and `\rangle` instead as in `\langle x,y\rangle` (typeset as `\langle x,y\rangle`).

3.2.2. Sets

In *AfM* we accept three ways of writing sets

$$\begin{aligned} \{x\in A:1<x<2\}, \\ \{x\in A;1<x<2\}, \\ \{x\in A|1<x<2\}. \end{aligned}$$

The authors should choose one of these ways and use it consistently. To use comma (,) instead is not acceptable. In the second case please use the command `\semicolon` (which is defined in `ml-afm.sty`) and in the last case please use `\mid` (but if the braces `{}` are larger also the `|` should be larger in which case one has to use just `|`, together with `\bigm` etc.).

Please use `\setminus` (`\`) to denote the difference of sets.

Abbreviating $\{x:u(x)>0\}$ by $\{u>0\}$ is not acceptable (the latter is really a set of u 's not x 's). However, if such constructions occur frequently this can be accepted, provided that a comment on the abuse of notation is given.

In *AfM* we denote the standard sets either using boldface, **N**, **Z**, **Q**, **R** and **C**, or blackboard bold, \mathbb{N} , \mathbb{Z} , \mathbb{Q} , \mathbb{R} and \mathbb{C} . Of course the usage should be consistent.

3.2.3. Fractions

In *AfM* we write fractions between explicit integers in *textstyle* as $\frac{1}{2}$ and $\frac{1}{10}$. All other fractions in *textstyle* are written using `/`, so, e.g., we write $1/2d$ and $\partial/\partial x$ (and *not* $\frac{1}{2d}$ and $\frac{\partial}{\partial x}$). A fraction like $d/2$ can alternatively be written as $\frac{1}{2}d$ (but please be consistent).

In *sub- and superscripts* we always write fractions using `/`, e.g., $f^{1/2}$. In *displaystyle*, on the other hand, we encourage the use of fractions such as

$$\frac{p}{q}.$$

3.2.4. Integrals, sums, unions, intersections and differentials

In expressions like

$$\int_A f(x) dx \quad \text{and} \quad \iint_A f(x) dx dy.$$

one should remember to have a thinspace (`\,`) before dx . In *AfM* the d is set in *math italic*. We also insist on explicitly writing the set over which the integration is done, if it is not too cumbersome to write. The set may be given as a condition as in

$$\int_{|x|<1} f(x) dx.$$

(An exception to the rule is if measures and their restrictions are clearly distinguished and it is clear on which set every measure is defined, then the set may be omitted.)

Similarly thinspace (`\,`) should be used in differentials such as $x dy + y dx$.

We also insist on the limits being explicit in sums, unions, intersections etc., as in

$$\sum_{j=1}^{\infty} a_j, \quad \text{and} \quad \bigcup_{j=1}^k E_j,$$

again with the exception of too cumbersome cases.

As for unions and intersections also note that `\cup` (\cup) and `\cap` (\cap) are used in expressions like $X \cup Y$, whereas `\bigcup` (\bigcup) and `\bigcap` (\bigcap) are used in expressions like $\bigcap_{j=1}^{\infty} E_j$.

3.2.5. Sequences and matrices

In *AfM* we write sequences using braces, e.g., $\{a_k\}_{k=1}^{\infty}$. As with sums etc. above we insist on the limits being given. When explicit limits cannot be given (or are too cumbersome) one should at least mark the index as in $\{a_k\}_k$.

For matrices $\{a_{jk}\}$ or tensors we do not require indices to be shown as subscripts.

3.2.6. Elementary functions

We write the elementary functions as they usually appear in modern higher mathematics, e.g. \log , \tan , \sinh , \cosh and \arcsin (not \ln , tg , sh , ch nor \sin^{-1}).

If some other logarithm is more relevant than the natural logarithm one can either write it explicitly as $\log_2 n$, or add a sentence such as “By \log we denote the logarithm to the base 2.”

3.2.7. Operators

Math operators are set upright in the same way as elementary functions. The preferable way to define such operators is to use commands like

```
\DeclareMathOperator{\diam}{diam}
\DeclareMathOperator*{\essinf}{ess\,inf}
```

(These commands come from the package `amsmath` which is used by the `AfM-SVJour` document class.)

In the latter definition we have inserted a `\,` and the `*` means that the limits appear as on \lim , i.e. sub- and superscripts appear below and above `ess inf` in `displaystyle` as in

$$\operatorname{ess\,inf}_{x \in B} u(x).$$

In *AfM* we set function classes such as $\text{BMO}(\Omega)$ and $\text{VMO}(\Omega)$ upright. Similarly we set groups such as $\text{SO}(n)$ and $\text{PSL}(2)$ upright, and also abbreviations (with at least two letters) as in $L^1_{\text{loc}}(\mathbf{R})$, $\sigma_{\text{ac}}(T)$ and CR-manifold. This is most easily handled using `\DeclareMathOperator` or `\textup`.

Note also that when `|` is used as a relation, as in $p|q$, one should write it as `\mid`.

3.2.8. `\notin` (\notin)

Please use `\notin` (\notin) and *never* `\not\in` ($\not\in$). (Already Knuth observed that the latter is inferior and that it should preferably never be used.)

3.2.9. `\forall` and `\exists`

In *AfM* we do not accept the use of `\forall` and `\exists` with the sole exception of articles dealing with formal logical expressions (when there is no alternative).

3.2.10. `\cdot`

If *AfM* we usually avoid using `\cdot` for ordinary multiplication between complex numbers. An exception is of course in expressions like $2 \cdot 3$. In expressions like $|x| |y|$ we prefer to insert a thinspace (`\,`) instead of `\cdot`.

3.2.11. Norms

Please use `\|` (`\|`) and *not* `||` (`||`) when writing norms such as $\|x\|$.

3.2.12. Restrictions

In *AfM* we write the restriction of f to the set A as $f|_A$.

3.2.13. i and ℓ

Authors who use i for the imaginary unit somewhere in their paper should avoid also using i as an index. (In *AfM* we do want to set the imaginary unit as i (not as, e.g., i or ι .) If necessary please change your indices (one possibility is to permute $i \mapsto j \mapsto k \mapsto l$).

In *AfM* we accept the use of ℓ . However it should not be used as an index or as a summation variable, so in

$$\sum_{l=1}^n (2l+1) \quad \text{and} \quad a_l,$$

one should use the usual l .

3.2.14. Mappings

For mappings such as $x \mapsto x^2$ one should use `\mapsto` (`\mapsto`) and not `\rightarrow`.

In mappings such as $f: A \rightarrow B$ (`f\colon A \to B`), please use `\colon`.

3.2.15. Proofs and \square

Proofs can be set in several ways, but the preferable way is to use the `proof` environment. Most proofs start with “*Proof.*” or, e.g., “*Proof of Theorem 1.1.*”, and then we insist on ending it by a \square . The \square should not be used for anything else but ending such proofs.

If a proof follows soon after the statement of a theorem (or similar) the proof should start with “*Proof.*”.

For a proof making up a whole (sub)section with a title such as “Proof of Theorem 1.1”, no \square should be used.

3.3. References

Please refer to references using `\cite`. Only cite one reference in each citation, i.e. write “[L] and [M]” instead of “[L,M]”. All references in the reference list should be cited in the text (please delete unnecessary references).

Authors should make sure that the information in the reference list is complete. *Mathematical Reviews* (*Math. Rev.*, the web version is called MathSciNet) and *Zentralblatt für Mathematik* contain the necessary information.

The references should either be numbered, or should have alphanumerical labels (which should be kept short!). They should be sorted alphachronologically (regardless of their labels), i.e., first according to the first author, then the second author, etc. For several items by the same authors the year of publication should decide the sorting.

Here are a few examples.

- [B] BJÖRN, J., Wiener criterion for Cheeger p -harmonic functions on metric spaces, in *Potential Theory in Matsue*, Advanced Studies in Pure Mathematics **44**, pp. 103–115, Mathematical Society of Japan, Tokyo, 2006
- [HK] HEINONEN, J. and KOSKELA, P., Quasiconformal maps in metric spaces with controlled geometry, *Acta Math.* **181** (1998), 1–61.
- [KZ] KEITH, S. and ZHONG, X., The Poincaré inequality is an open ended condition, *Preprint*, Jyväskylä, 2003.
- [KM] KINNUNEN, J. and MARTIO, O., Choquet property for the Sobolev capacity in metric spaces, in *Proceedings on Analysis and Geometry (Novosibirsk, Akademgorodok, 1999)*, pp. 285–290, Sobolev Institute Press, Novosibirsk, 2000.
- [L] LANDKOF, N. S., *Foundations of Modern Potential Theory*, Nauka, Moscow, 1966 (Russian). English transl.: Springer, Berlin–Heidelberg, 1972.
- [Le] LENELLS, J., Riemannian geometry on the diffeomorphism group of the circle, to appear in *Ark. Mat.*
- [M] MAZ'YA, V. G., On the continuity at a boundary point of solutions of quasi-linear elliptic equations, *Vestnik Leningrad. Univ. Mat. Mekh. Astronom.* **25**:13 (1970), 42–55 (Russian). English transl.: *Vestnik Leningrad Univ. Math.* **3** (1976), 225–242.
- [R] RUDIN, W., *Functional Analysis*, 2nd ed., McGraw-Hill, New York, 1991.
- [W] WERMER, J., *Potential Theory*, Lecture Notes in Math. **408**, Springer, Berlin–Heidelberg, 1974.

Note the following:

Journal papers: The name of the journal should be abbreviated using the current abbreviation by *Math. Rev.*

Book series: The name of a book series (and volume number) is optional, apart from in the case of *Lecture Notes in Math.* by Springer. (This applies to books, proceedings and other collective publications.)

Translations: For a paper/book not written in a language using the Latin alphabet, e.g. Russian, Chinese or Japanese, the title should be translated into English, with the original language stated within brackets. If an English translation exists both a reference to it and to the original should be made. (See [L] and [M].)

Please consult one of the latest issues of *Arkiv för matematik* for more examples of references.

3.3.1. Spelling of names

The name of a person should be spelt consistently throughout the paper. In case of transcription from Cyrillic it should follow the present transcription system of *Math. Rev.* or should be the form that the person herself/himself uses when writing in English today.

Here are the spellings of some names of mathematicians (one do not necessarily have to use all initials):

Blocki, Z.	Hele-Shaw, H. S.	Rényi, A.
Cesàro, E.	Henkin, G. M.	Sierpiński, W.
Erdős, P.	Hölder, O.	Solomyak, M.
Foias, C.	Kähler, E.	Stensønes, B.
Fornæss, J. E.	Kreĭn, S. G.	Szegő, G.
Forstnerič, F.	Maz'ya, V. G.	Sz.-Nagy, B.
Hajlasz, P.	Möbius, A. F.	Uraltseva, N. N.
Havin, V. P.	Nikol'skii, S. M.	

Please observe the use of $\backslash H$ in Erdős and Szegő. Note also that we use $\backslash cprime$ (which is defined in `ml-afm.sty`) to denote the Cyrillic soft character ' in Maz'ya and Nikol'skii.