Mathabx series

Informations and tests

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The mathabx series form a large mathematical symbols set designed and defined in MetaFont language. Many common and uncommon symbols can be found in these series. These programs are intended to produce bitmap fonts and a lot of care is given about rasterization. Encoding, metrics, designs are not supposed to be frozen since improvements, changes of mind can always happen. Thus, *this distribution is still (September 26, 2005) at a "merely for evaluation" level.* Please check my MetaFont web page to get the last updates:

`http://www-math.univ-poitiers.fr/~phan/metafont.html`

By now, there are three main series of fonts: *matha*, *mathb* and *mathx*. The *matha* series consist in quite usual mathematical symbols, more precisely they contain the, say, 64 mathematical symbols one can use and suppose other ones know their meaning. The *mathb* series is a kind of twin of *matha*, but it is the one people should not show outside of the house: these symbols do not have a very well known meaning and, thus (to my very own opinion), should not be used. The *mathx* series is the set of extensible delimiters and large operators fitting *matha* and *mathb*; its encoding doesn't match at all the *cmex* one, but it may change in the future.

Since a metafont designer doesn't always know when to stop creating or coding stuff, many pieces of code remained once the three former series where filled. The remaining stuff has been put in *mathu* (*u* stands for unsupported) and in *mathux* (*ux* stands for unsupported extensible). There is also "work in progress"-material: some full OT1 implementation of calligraphic characters. If this last task find an end, there would be a *mathc* series—where *c* would stand for calligraphic.

The translation of this document into english is not yet finished. We do apologize for this.

Progress

April 29, 2002. First posting on CTAN.

June 19, 2002. A few changes have been done:

- Some large symbols are now thicker (`\bigcup`, etc.);
- "Flat cups" have been introduced (`\bigcup`, etc.), that means that the roundish parts of those symbols are now "flatter".

November 16, 2002.

- Some work has been done on the calligraphic set. The uppercase subset should be exactly the *Computer Modern*'s one. So kerning has to be done in order to get a nice stuff.
- The series *mathux* are in progress. It will contain more extensible symbols (unnecessary I think, so still unsupported).

- Binary operators `\smallprod` and `\smallcoprod` have been added to *matha* at locations `"3C` and `"3D`. I love those symbols and I believe that they must lie on the main symbols series.

July 29, 2003.

- Some LaTeX bugs have been fixed in `mathabx.dcl` with the help of some very kind users (Patrick Cousot, Hung N. Duong, Kohsaku Hotta).
- The file `mathgrey.mf` is no longer used. This means that `mathu10` has no more grey characters. It seems that those characters are not compatible with some PostScript or such translation (with `TeXtrace` for instance).
- The LaTeX style file `mathabx.sty` allows options which are `matha`, `mathb` and `mathx`. These options define which series will be used. If no option is given, the three series will be used. (The plainTeX file `mathabx.tex` does not allow anything of this kind.)

October 23, 2003.

- The `\bar` and `\widebar` accents have changed of height (which is now smaller).
- Arrows have a wider breadth and a lighter head.
- A little work on calligraphic digits has been done.
- Double brackets formerly named `\lbbbrack` and `\rbbbrack` are now named `\ldbrack` and `\rdbrack`, and they still have their curious aliases `\lsemantic` and `\rsemantic`.

May 18, 2005.

- I didn't pay attention until recently to the fact that square roots may appear also in `\scriptstyle` and `\scriptscriptstyle` modes. This makes necessary to make the corresponding symbols go across some usual symbols set and the extensible characters set. This is repaired: a basic radical symbol now lies in *matha* at location `"37`. In fact, the former basic radical symbol in *mathx* still exists at place `"60` and there was no problem if *mathx* is used in 3 different sizes.
- The `\bar` and `\widebar` accents have been restored to their former heights.
- Large greek like symbols (sums, products, coproducts) have been revised. Text-style product and coproduct widths have been increased by $u\#$. Also, in *matha*, small sum, product, coproduct have changed of encoding since the small sum has been introduced.
- *mathc* has finally been introduced. It is still an uncomplete calligraphic set. Also existing glyphs may be revised.
- Integrals have been revised. Comments are welcome.
- Astronomical/logical symbols are in progress.
- PlainTeX/LaTeX files have been revised.
- The style file `mathabx.sty` has a new option: `extra`.
- Things are changing in *matha* and *mathb* about arrows and such.

June 2005.

- Too may things to be listed. Please note the changes in fonts names: a "m" has been introduced for "medium" and a "b" for "bold". Thus fonts names are now `matham12`, ..., `matham5`, `mathbm12`, ..., `mathbm5`, `mathxm12`, ..., `mathxm5`, `mathab12`, ..., `mathab5`, `mathbb12`, ..., `mathbb5`, `mathxb12`, ..., `mathxb5`, and also unsupported things `mathum10`, `mathuxm10`, `mathub10`, `mathuxb10`. Bold fonts are experimental and yet not supported. Former names (`matha12`, ..., `matha5`,

`mathb12`, ..., `mathb5`, `mathx12`, ..., `mathx5`, `mathc10`, `mathu10`, `mathux10`) are still supported but depreceated.

Summer 2005.

- Andrzej Pietuszczack corrected some errors in `mathb12.mf` and and such: the `font_size` parameter was set to 10 pt! He also pointed an error in `mathabx.dcl` about unsupported `\maltese` cross and suggested new symbols: `\strictif`, `\strictfi` and `\strictiff`. These have been added to the `mathu` series and since they are very not perfect, they are unsupported yet.
- David Chase suggested to add many symbols in the unsupported series. To be done?
- Font sizes for large operators (`mathx`) behave now as in LaTeX when using the package `mathabx.sty`. Also the new option `exscale` has been introduced: it does the same job as `exscale.sty`.

1. List of every mathabx' symbols

Thereafter will be loaded plainTeX definitions files related to these fonts families. Assigning any value to the control sequence `\proofmode` like `\let\proofmode=!`, for instance, the definition of every symbol will be made together with the printing of the related informations. The control sequence `\proofmode` will be reset to `\undefined` at the end of the loading. This can be helpful for instantaneous documentation.

About the names of the different control sequences, we mostly tried to conform to the usual names. If in the following there is some apparent mismatch with *AMS* denomination, it is normally supported. Below is printed first the symbol, then if it already exists the *Computer Modern* or *AMS* one, the name of the control sequence, in exponent the spacing value of the symbol ("other" means that it is an accent or such, it does not really matter), at last—if any—its aliases.

Don't be too surprised if, in the following some supposedly "older" symbols are at least partly designed as *mathabx'* ones. Some older symbols are defined as macros that uses common symbols. In the following definitions common symbols are replaced by *mathabx'* ones. So, when such a construction is encountered and replaced by a *mathabx* symbol, what is shown is the "old" construction but nothing else.

⇒ *Specials characters (matha/mathb).* The two next symbols are zero-width symbols intended to negate common relations (with width equal to 14 mu) by overlapping them from the left to the right. The first symbol is defined in *matha*, the second one in *mathb*.

`\notsign`^{rel}	/	`\varnotsign`^{rel}

The control sequence `\not` is defined anew. Executing `\not\xxx`, it tests if `\notxxx` is a known control sequence and if the answer is true it applies `\notxxx`; if the answer is false, it tests if `\nxxx` is defined and if the answer is true it applies `\nxxx`; if both are false one gets `\notsign\xxx`. There is also the control sequence `\varnot` whose mecanism is close to the one of `\not` except that tests only `\varnotxxx` and uses at last `\varnotsign`. It is also possible to switch between `\notsign` and `\varnotsign` with the control sequence `\changenotsign` (local effect). With LaTeX, one can load

only one of the series *matha* or *mathb*. The definitions of the former control sequences are also set with respect to such a choice. (*Look* later on for examples.)

The following symbol (*matha*) is simply the centered dot with which various centered dots (⋯ `\cdots`) are constructed in plainTEX or LATEX. It may look like an oddity in *mathabx* series, bot the corresponding glyph appears next as the usual binary operator `\cdot`.

·	·	`\cdotp`^{punct}

⇒ *Usual binary operators (matha).* Here we have some quite common binary operators (except `\asterisk` and `\coasterisk` which are ordinary symbols). The prefix "co" before "asterisk" or such always means that the asterisk is rotated by 30 degrees. Such asterisks, the six branched star `\varstar` and the symbols `\smallsum` and `\smallprod` may not be found elsewhere. Should they disappear? (*See* also the next paragraph.)

+	+	`+`^{bin}
×	×	`\times`^{bin}
·	·	`\cdot`^{bin}
∗	∗	`*`^{bin}
⁎		`\asterisk`^{ord}
⍟		`\coasterisk`^{ord}
∓	∓	`\mp`^{bin}
⋊	⋊	`\rtimes`^{bin}
•	•	`\bullet`^{bin}
⋆		`\varstar`^{bin}
∏		`\smallprod`^{bin}
–	–	`-`^{bin}
÷	÷	`\div`^{bin}
○	○	`\circ`^{bin}
∗	∗	`\ast`^{bin}
⍣		`\coast`^{bin}
±	±	`\pm`^{bin}
⋉	⋉	`\ltimes`^{bin}
◇	◇	`\diamond`^{bin}
⋆	⋆	`\star`^{bin}
Σ		`\smallsum`^{bin}
∐	∐	`\amalg`^{bin}, `\smallcoprod`

⇒ *Unusual binary operators (mathb).* Here we have some quite to very uncommon binary operators. Some of them may seem to be pure oddities (`\dottimes`, `\udot`, `\Asterisk`, `\bigast` [which is an operator], `\coAsterisk`, `\bigcoast` [which is an operator], `\convolution` and `\bigvarstar`).

∔	∔	`\dotplus`^{bin}
⁙		`\dottimes`^{bin}
⟑		`\udot`^{bin}
⁕		`\Asterisk`^{bin}
✲		`\coAsterisk`^{bin}
⟊		`\circplus`^{bin}
✳		`\convolution`^{bin}
◆		`\blackdiamond`^{bin}
★	★	`\bigstar`^{bin}
∸		`\dotminus`^{bin}
⨪		`\minusdot`^{bin}
▫	□	`\square`^{bin}
✻		`\bigast`^{op}
✼		`\bigcoast`^{op}
⨦		`\pluscirc`^{bin}
⋇	⋇	`\divideontimes`^{bin}
▪		`\sqbullet`^{bin}, `\centerdot`
★		`\bigvarstar`^{bin}

The symbols `\dotminus`, `\dottimes` and `\minusdot` have been suggested in a STIX submission [STIX98]. Anyway, it was natural to design them in *mathb* since they are some kinds of duals of the corresponding symbols in *matha*.

The symbol `\udot` should have been mentionned somewhere as a "capital letter centered dot", thus it is clear to understand for what it has been designed: just compare $A \cdot B$ which has been coded with `\cdot` and $A \cdot B$.

There is nothing much to say about asterisks: they remain in *mathb* because they are already in *matha*. Also, one can look at the following:

$$x_1 * \cdots * x_m = \overset{m}{\underset{i=1}{\circledast}} x_i \qquad \text{and} \qquad y_1 * \cdots * y_n = \overset{n}{\underset{j=1}{\circledast}} y_i$$

which is meaningless but cute. Otherwise, large asterisks are well suited for use as binary operators ($X \circledast Y$).

The symbols `\circplus` and `\pluscirc` can be found in the fonts tables of *The Printing of Mathematics*, T.W. Chaudy, P.R. Barret and C. Batey, Oxford University Press, third impression (1965) [PoM]; the symbol `\convolution` may be renamed. I saw it once in one of my undergraduate books; `\blackdiamond` is just the dual of `\diamond`; `\sqbullet` is obvious but its alias `\centerdot` is not (in fact I don't know what AMS intended to do with this one); `\bigstar` is just more reasonnable than the former one; and at last `\bigvarstar` ows its existence to the one of `\varstar`.

⇒ *Usual relations (matha).* There is almost nothing to say about these relation symbols. `\cong` was formerly built from to other symbols (`\sim` and `=`), that's why it appears on the right drawn with the corresponding *mathabx* symbols.

$=$	$=$	`=`^{rel}	$\equiv$	$\equiv$	`\equiv`^{rel}
$\sim$	$\sim$	`\sim`^{rel}	$\approx$	$\approx$	`\approx`^{rel}
$\simeq$	$\simeq$	`\simeq`^{rel}	$\cong$	$\cong$	`\cong`^{rel}
$\asymp$	$\asymp$	`\asymp`^{rel}	$\mid$		`\divides`^{rel}
$\neq$	$\neq$	`\neq`^{rel}, `\ne`	$\not\equiv$		`\notequiv`^{rel}, `\nequiv`
$\not\sim$	$\not\sim$	`\nsim`^{rel}	$\not\approx$		`\napprox`^{rel}
$\not\simeq$		`\nsimeq`^{rel}	$\not\cong$	$\not\cong$	`\ncong`^{rel}
$\not\asymp$		`\notasymp`^{rel}	$\nmid$		`\notdivides`^{rel}, `\ndivides`

The negated relations are also defined. Thus, according to a former paragraph, `\not\sim` would be replaced by `\nsim` ($\not\sim$) but `\not=` would be replaced by `\notsign=` ($\neq$ to which one should prefer $\neq$). Furthermore, `\varnot\sim` would be replaced by `\varnotsign\sim` ($\not\sim$). If one exchanges the negation signs with `\changenotsign`, one gets $\not\sim$ and $\neq$ with the `\not` control sequence, but $\not\sim$ and $\neq$ with `\varnot`.

⇒ *Unusual relations (mathb).* The next relation symbols look really uncommon to me. But there was a time when some discussion group proposed such symbols.

$\doteq$		`\topdoteq`^{rel}	$\fallingdotseq$		`\botdoteq`^{rel}
$\fallingdotseq$		`\dotseq`^{rel}, `\doteqdot`, `\Doteq`	$\risingdotseq$	$\risingdotseq$	`\risingdotseq`^{rel}
$\risingdotseq$	$\risingdotseq$	`\fallingdotseq`^{rel}	$\coloneq$		`\coloneq`^{rel}
$\eqcolon$		`\eqcolon`^{rel}	$\bumpeq$		`\bumpedeq`^{rel}
$\eqcirc$		`\eqbumped`^{rel}	$\Bumpeq$		`\Bumpedeq`^{rel}
$\circeq$	$\circeq$	`\circeq`^{rel}	$\eqcirc$	$\eqcirc$	`\eqcirc`^{rel}
$\triangleq$	$\triangleq$	`\triangleq`^{rel}	$\corresponds$		`\corresponds`^{rel}

They are not negated because they are too unusual. To obtain the negation one has to choose between `\not` and `\varnot`. For instance, $a \not\doteq b$ and $a \neq b$.

⇒ *Miscellaneous (matha).* Here is a list of various symbols: quite common ordinary ones and logical relations.

¬	¬	\neg^{ord}, \lnot	⋕		\hash^{ord}
⊢	⊢	\vdash^{rel}	⫤	⫤	\dashv^{rel}
⊬	⊬	\nvdash^{rel}	⫮		\ndashv^{rel}
⊨	⊨	\vDash^{rel}	⫣		\Dashv^{rel}
⊭	⊭	\nvDash^{rel}	⫯		\nDashv^{rel}
⊩	⊩	\Vdash^{rel}	⫥		\dashV^{rel}
⊮	⊮	\nVdash^{rel}	⫰		\ndashV^{rel}
∘		\degree^{ord}	′	′	\prime^{ord}
″		\second^{ord}	‴		\third^{ord}
⁗		\fourth^{ord}	♭	♭	\flat^{ord}
♮	♮	\natural^{ord}	♯	♯	\sharp^{ord}
∞	∞	\infty^{ord}	∝	∝	\propto^{rel}
†	†	\dagger^{ord}	‡	‡	\ddagger^{ord}

Nous avons réintroduit les signes \prime multiples associés aux commandes \prime, \second, \third et \fourth. Une commande naturellement associée est \degree correspondant à un symbole semblable à celui appelé par \circ. Il est néanmoins différent car il doit être homogène à l'ensemble des symboles précédents (comparer 44° et 44°).

$$44^\circ + 36' + 89'' + 46''' + 99''''$$

La construction habituelle (*i.e.* 99'''') supporte une propriété de ligaturage sur les caractères correspondants. C'est ce que l'on voit ci-dessous :

$$44^\circ + 36' + 89'' + 46''' + 99'''', \qquad \text{mais} \quad 99''''' \quad \text{ou} \quad 99'''''''.$$

(Il faut y regarder de très près pour y voir ce qu'il faut voir...)

⇒ *Miscellaneous (mathb).*

≬	≬	\between^{rel}	⌣	⌣	\smile^{rel}
⌢	⌢	\frown^{rel}	#		\varhash^{ord}
⋋	⋋	\leftthreetimes^{ord}	⋌	⋌	\rightthreetimes^{ord}
⋔	⋔	\pitchfork^{ord}	⋈	⋈	\bowtie^{rel}, \Join
⊫		\VDash^{rel}	⫪		\DashV^{rel}
⊯	⊯	\nVDash^{rel}	⫫		\nDashV^{rel}
⊪	⊪	\Vvdash^{rel}	⫦		\dashVv^{rel}
⊯		\nVvash^{rel}	⫧		\ndashVv^{rel}
∴	∴	\therefore^{rel}	∵	∵	\because^{rel}
°		\ring^{other}	˙		\dot^{other}
¨		\ddot^{other}	⃛		\dddot^{other}
⃜		\ddddot^{other}	∠	∠	\angle^{ord}
⍼	⍼	\measuredangle^{ord}	⍼	⍼	\sphericalangle^{ord}
⍭		\rip^{ord}			

The \rip sign is mostly for fun. It is not an astronomical/logical symbol but is located among them in *mathb*. In the Theory of Markov Processes, a cemetery sign is often needed. We have designed the following ugly and not so necessary one: ⍭⍭⍭⍭. Many successive \rip signs glue to each others.

⇒ *Delimiters as symbols (matha).*

(	(	(^{open}	)	)	)^{close}
[	[	[^{open}	]	]	]^{close}
\	\	\setminus^{ord}	/	/	/^{ord}
|	|	|^{ord}	|	|	\mid^{rel}

The only thing one should notice here is that `\setminus` is defined here as an ordinary symbol. There are two reasons for that: division as the slash symbol (`/`) has also an ordinary value; spacing with `\setminus` defined has a binary operator is too large for my own taste.

⇒ *Delimiters as symbols (mathb).* The following delimiters have no extensible versions.

⌜		\lcorners^{open}	⌝		\rcorners^{close}
⌜	⌜	\ulcorner^{open}	⌝	⌝	\urcorner^{close}
⌞	⌞	\llcorner^{open}	⌟	⌟	\lrcorner^{close}

⇒ *Astronomical and astrological symbols (mathb).* The set of astronomical/logical symbols is not complete. It will certainly be moved in the future to some *mathf* or *mathg* series (Funny or Games). (*mathd* may be reserved for double stroked or blackboard fonts [mbb] by the same author).

⊙	\Sun^{ord}	☿	\Mercury^{ord}
♀	\Venus^{ord}, \girl	⊕	\Earth^{ord}
♂	\Mars^{ord}, \boy	♃	\Jupiter^{ord}
♄	\Saturn^{ord}	♅	\Uranus^{ord}
♆	\Neptune^{ord}	♇	\Pluto^{ord}
♁	\varEarth^{ord}	☾	\leftmoon^{ord}, \Moon
☽	\rightmoon^{ord}	○	\fullmoon^{ord}
●	\newmoon^{ord}	♈	\Aries^{ord}
♉	\Taurus^{ord}	♊	\Gemini^{ord}
♌	\Leo^{ord}	♎	\Libra^{ord}
♏	\Scorpio^{ord}		

⇒ *Letter like symbols (matha).*

∀	∀	\forall^{ord}	∁	∁	\complement^{ord}
∂	∂	\partial^{ord}	ⅆ		\partialslash^{ord}
∃	∃	\exists^{ord}	∄	∄	\nexists^{ord}
∃	∃	\Finv^{ord}	⅁	⅁	\Game^{ord}
∅	∅	\emptyset^{ord}	⌀		\diameter^{ord}
⊤	⊤	\top^{ord}	⊥	⊥	\bot^{ord}
⊥	⊥	\perp^{rel}	⊬		\nottop^{ord}
⊥̸		\notbot^{ord}	⊥̸		\notperp^{rel}
⅄	⅄	\curlywedge^{bin}	⅄	⅄	\curlyvee^{bin}
∈	∈	\in^{rel}	∋	∋	\owns^{rel}, \ni
∉	∉	\notin^{rel}	∌		\notowner^{rel}, \notni, \notowns
∉		\varnotin^{rel}	∌		\varnotowner^{rel}
∈̄		\barin^{rel}	∋̄		\ownsbar^{rel}, \nibar

$\cap$	$\Cap$	\cap^{bin}	$\cup$	$\Cup$	\cup^{bin}
$\uplus$	$\biguplus$	\uplus^{bin}	$\sqcap$	$\bigsqcap$	\sqcap^{bin}
$\sqcup$	$\bigsqcup$	\sqcup^{bin}	$\boxplus$		\squplus^{bin}
$\wedge$	$\bigwedge$	\wedge^{bin}, \land	$\vee$	$\bigvee$	\vee^{bin}, \lor

⇒ *Letter like symbols (mathb).*

$\barwedge$	$\bigbarwedge$	\barwedge^{bin}	$\veebar$	$\bigveebar$	\veebar^{bin}
$\doublebarwedge$	$\bigdoublebarwedge$	\doublebarwedge^{bin}	$\veedoublebar$		\veedoublebar^{bin}
$\doublecap$	$\Cap$	\doublecap^{bin}, \Cap	$\doublecup$	$\Cup$	\doublecup^{bin}, \Cup
$\sqdoublecap$		\sqdoublecap^{bin}, \sqCap	$\sqdoublecup$		\sqdoublecup^{bin}, \sqCup

⇒ *Subset's and superset's signs (matha).*

$\subset$	$\Subset$	\subset^{rel}	$\supset$	$\Supset$	\supset^{rel}
$\nsubset$		\nsubset^{rel}	$\nsupset$		\nsupset^{rel}
$\subseteq$	$\subseteqq$	\subseteq^{rel}	$\supseteq$	$\supseteqq$	\supseteq^{rel}
$\nsubseteq$	$\nsubseteqq$	\nsubseteq^{rel}	$\nsupseteq$	$\nsupseteqq$	\nsupseteq^{rel}
$\subsetneq$	$\subsetneqq$	\subsetneq^{rel}	$\supsetneq$	$\supsetneqq$	\supsetneq^{rel}
$\varsubsetneq$	$\varsubsetneqq$	\varsubsetneq^{rel}	$\varsupsetneq$	$\varsupsetneqq$	\varsupsetneq^{rel}
$\subseteqq$		\subseteqq^{rel}	$\supseteqq$		\supseteqq^{rel}
$\nsubseteqq$		\nsubseteqq^{rel}	$\nsupseteqq$		\nsupseteqq^{rel}
$\subsetneqq$		\subsetneqq^{rel}	$\supsetneqq$		\supsetneqq^{rel}
$\varsubsetneqq$		\varsubsetneqq^{rel}	$\varsupsetneqq$		\varsupsetneqq^{rel}
$\Subset$	$\subset$	\Subset^{rel}	$\Supset$	$\supset$	\Supset^{rel}
$\nSubset$		\nSubset^{rel}	$\nSupset$		\nSupset^{rel}

⇒ *Square subset's and superset's signs (mathb).*

$\sqsubset$	$\Sqsubset$	\sqsubset^{rel}	$\sqsupset$	$\Sqsupset$	\sqsupset^{rel}
$\nsqsubset$		\nsqsubset^{rel}	$\nsqsupset$		\nsqsupset^{rel}
$\sqsubseteq$	$\sqsubseteqq$	\sqsubseteq^{rel}	$\sqsupseteq$	$\sqsupseteqq$	\sqsupseteq^{rel}
$\nsqsubseteq$		\nsqsubseteq^{rel}	$\nsqsupseteq$		\nsqsupseteq^{rel}
$\sqsubsetneq$		\sqsubsetneq^{rel}	$\sqsupsetneq$		\sqsupsetneq^{rel}
$\varsqsubsetneq$		\varsqsubsetneq^{rel}	$\varsqsupsetneq$		\varsqsupsetneq^{rel}
$\sqsubseteqq$		\sqsubseteqq^{rel}	$\sqsupseteqq$		\sqsupseteqq^{rel}
$\nsqsubseteqq$		\nsqsubseteqq^{rel}	$\nsqsupseteqq$		\nsqsupseteqq^{rel}
$\sqsubsetneqq$		\sqsubsetneqq^{rel}	$\sqsupsetneqq$		\sqsupsetneqq^{rel}
$\varsqsubsetneqq$		\varsqsubsetneqq^{rel}	$\varsqsupsetneqq$		\varsqsupsetneqq^{rel}
$\sqSubset$		\sqSubset^{rel}	$\sqSupset$		\sqSupset^{rel}
$\nsqSubset$		\nsqSubset^{rel}	$\nsqSupset$		\nsqSupset^{rel}

⇒ *Triangles as relations (matha).*

$\triangleleft$	$\blacktriangleleft$	\triangleleft^{bin}	$\vartriangleleft$	$\blacktriangleleft$	\vartriangleleft^{rel}
$\triangleright$	$\blacktriangleright$	\triangleright^{bin}	$\vartriangleright$	$\blacktriangleright$	\vartriangleright^{rel}
$\ntriangleleft$		\ntriangleleft^{rel}	$\ntriangleright$		\ntriangleright^{rel}
$\trianglelefteq$		\trianglelefteq^{rel}	$\trianglerighteq$		\trianglerighteq^{rel}
$\ntrianglelefteq$		\ntrianglelefteq^{rel}	$\ntrianglerighteq$		\ntrianglerighteq^{rel}

⇒ *Triangles as binary operators (mathb).*

△		\smalltriangleup^{bin}	▽		\smalltriangledown^{bin}
◁		\smalltriangleleft^{bin}	▷		\smalltriangleright^{bin}
▲		\blacktriangleup^{bin}	▼	▼	\blacktriangledown^{bin}
◀	◀	\blacktriangleleft^{bin}	▶	▶	\blacktriangleright^{bin}

⇒ *Inequalities (matha).*

≪	≪	\ll^{rel}	≫	≫	\gg^{rel}
<	<	<^{rel}	>	>	>^{rel}
≮	≮	\nless^{rel}	≯	≯	\ngtr^{rel}
⩽	≤	\leq^{rel}, \le, \leqslant	⩾	≥	\geq^{rel}, \ge, \geqslant
⩽̸	≰	\nleq^{rel}, \nleqslant	⩾̸	≱	\ngeq^{rel}, \ngeqslant
⊴		\varleq^{rel}	⊵		\vargeq^{rel}
⋬		\nvarleq^{rel}	⋭		\nvargeq^{rel}
⪇	≨	\lneq^{rel}	⪈	≩	\gneq^{rel}
≦	≦	\leqq^{rel}	≧	≧	\geqq^{rel}
≦̸	≦̸	\nleqq^{rel}	≧̸	≧̸	\ngeqq^{rel}
⪇	≨	\lneqq^{rel}	⪈	≩	\gneqq^{rel}
≨	≨	\lvertneqq^{rel}	≩	≩	\gvertneqq^{rel}
⩽	⩽	\eqslantless^{rel}	⩾	⩾	\eqslantgtr^{rel}
⩽̸		\neqslantless^{rel}	⩾̸		\neqslantgtr^{rel}
≶	≶	\lessgtr^{rel}	≷	≷	\gtrless^{rel}
⋚	⋚	\lesseqgtr^{rel}	⋛	⋛	\gtreqless^{rel}
⋚	⋚	\lesseqqgtr^{rel}	⋛	⋛	\gtreqqless^{rel}
≲	≲	\lesssim^{rel}	≳	≳	\gtrsim^{rel}
≴		\nlesssim^{rel}	≵		\ngtrsim^{rel}
⪉	⪉	\lnsim^{rel}	⪊	⪊	\gnsim^{rel}
≲	≲	\lessapprox^{rel}	≳	≳	\gtrapprox^{rel}
≴		\nlessapprox^{rel}	≵		\ngtrapprox^{rel}
⪉	⪉	\lnapprox^{rel}	⪊	⪊	\gnapprox^{rel}
⋖	⋖	\lessdot^{rel}	⋗	⋗	\gtrdot^{rel}
⋘	⋘	\lll^{rel}	⋙	⋙	\ggg^{rel}

⇒ *Inequalities (mathb).*

≺	≺	\prec^{rel}	≻	≻	\succ^{rel}
⊀	⊀	\nprec^{rel}	⊁	⊁	\nsucc^{rel}
≼	≼	\preccurlyeq^{rel}	≽	≽	\succcurlyeq^{rel}
⋠		\npreccurlyeq^{rel}	⋡		\nsucccurlyeq^{rel}
⪯	⪯	\preceq^{rel}	⪰	⪰	\succeq^{rel}
⪯̸	⪯̸	\npreceq^{rel}	⪰̸	⪰̸	\nsucceq^{rel}
⪹		\precneq^{rel}	⪺		\succneq^{rel}
≼	≾	\curlyeqprec^{rel}	≽	≿	\curlyeqsucc^{rel}
⋞		\ncurlyeqprec^{rel}	⋟		\ncurlyeqsucc^{rel}
≾	≾	\precsim^{rel}	≿	≿	\succsim^{rel}
⋨		\nprecsim^{rel}	⋩		\nsuccsim^{rel}
⪹	⪹	\precnsim^{rel}	⪺	⪺	\succnsim^{rel}

$\precapprox$	$\precapprox$	\precapprox[rel]	$\succapprox$	$\succapprox$	\succapprox[rel]
$\not\precapprox$		\nprecapprox[rel]	$\not\succapprox$		\nsuccapprox[rel]
$\precnapprox$	$\precnapprox$	\precnapprox[rel]	$\succnapprox$	$\succnapprox$	\succnapprox[rel]
$\preccurlyeq$		\precdot[rel]	$\succcurlyeq$		\succdot[rel]
$\lll$		\llcurly[rel]	$\ggg$		\ggcurly[rel]

⇒ *Arrows and harpoons (matha).*

$\leftarrow$	$\leftarrow$	\leftarrow[rel], \gets	$\rightarrow$	$\rightarrow$	\rightarrow[rel], \to
$\nwarrow$	$\nwarrow$	\nwarrow[rel]	$\nearrow$	$\nearrow$	\nearrow[rel]
$\swarrow$	$\swarrow$	\swarrow[rel]	$\searrow$	$\searrow$	\searrow[rel]
$\leftrightarrow$	$\leftrightarrow$	\leftrightarrow[rel]	$\nleftarrow$	$\nleftarrow$	\nleftarrow[rel]
$\nrightarrow$	$\nrightarrow$	\nrightarrow[rel]	$\nleftrightarrow$	$\nleftrightarrow$	\nleftrightarrow[rel]
$\leftharpoonup$	$\leftharpoonup$	\leftharpoonup[rel]	$\rightharpoonup$	$\rightharpoonup$	\rightharpoonup[rel]
$\leftharpoondown$	$\leftharpoondown$	\leftharpoondown[rel]	$\rightharpoondown$	$\rightharpoondown$	\rightharpoondown[rel]
$\upharpoonleft$	$\upharpoonleft$	\upharpoonleft[rel]	$\downharpoonleft$	$\downharpoonleft$	\downharpoonleft[rel]
$\upharpoonright$	$\upharpoonright$	\upharpoonright[rel]	$\restriction$	$\restriction$	\restriction[ord]
$\downharpoonright$	$\downharpoonright$	\downharpoonright[rel]	$\leftrightharpoons$	$\leftrightharpoons$	\leftrightharpoons[rel]
$\rightleftharpoons$	$\rightleftharpoons$	\rightleftharpoons[rel]	$\updownharpoons$		\updownharpoons[rel]
$\downupharpoons$		\downupharpoons[rel]	$\Leftarrow$	$\Leftarrow$	\Leftarrow[rel]
$\Rightarrow$	$\Rightarrow$	\Rightarrow[rel]	$\Leftrightarrow$	$\Leftrightarrow$	\Leftrightarrow[rel]
$\nLeftarrow$	$\nLeftarrow$	\nLeftarrow[rel]	$\nRightarrow$	$\nRightarrow$	\nRightarrow[rel]
$\nLeftrightarrow$	$\nLeftrightarrow$	\nLeftrightarrow[rel]			

⇒ *Arrows toolkit (matha).* This very small arrows kit contains the standard things: left and right hooks, various maps to or from characters, bars for extensions. These last ones are different from minus and equal signs since they are a bit longer (of 1 mu but their actual width are the same) than them. Short things (in fact arrows heads) are here but nothing is planned to do with them (they are some adaptation of AMS corresponding symbols but I just don't know what to do with them). Tails have been introduced (*see* [PoM]), they just overlap (no `\joinrel` needed) the following of preceding relation character in order to give the aspect of a feathered arrow. Bricks for negating long arrows (simple, double and harpoons) are also provided.

$\shortleftarrow$		\shortleftarrow[rel]	$\shortrightarrow$		\shortrightarrow[rel]
$\rhook$	$\rhook$	\rhook[rel]	$\lhook$	$\lhook$	\lhook[rel]
$\relbar$	$\relbar$	\relbar[rel]	$\not\relbar$		\notrelbar[rel]
$\mapstochar$	$\mapstochar$	\mapstochar[rel]	$\mapsfromchar$		\mapsfromchar[rel]
$\Relbar$	$\Relbar$	\Relbar[rel]	$\not\Relbar$		\notRelbar[rel]
$\Mapstochar$		\Mapstochar[rel]	$\Mapsfromchar$		\Mapsfromchar[rel]
$\leftarrowtail$		\leftarrowtailchar[rel]	$\rightarrowtail$		\rightarrowtailchar[rel]

For instance, one can build $a \hookrightarrow b$, $a \mapsto b$, $a \twoheadrightarrow b$, $a \twoheadrightarrow b$, $a \twoheadrightarrow b$.

⇒ *Arrows and harpoons (mathb).*

$\leftleftarrows$	$\leftleftarrows$	\leftleftarrows[rel]	$\rightrightarrows$	$\rightrightarrows$	\rightrightarrows[rel]
$\upuparrows$	$\upuparrows$	\upuparrows[rel]	$\downdownarrows$	$\downdownarrows$	\downdownarrows[rel]
$\leftrightarrows$	$\leftrightarrows$	\leftrightarrows[rel]	$\rightleftarrows$	$\rightleftarrows$	\rightleftarrows[rel]
$\updownarrows$		\updownarrows[rel]	$\downuparrows$		\downuparrows[rel]

⇐		\leftleftharpoons^{rel}	⇒		\rightrightharpoons^{rel}
⇑		\upupharpoons^{rel}	⇓		\downdownharpoons^{rel}
⥢		\leftbarharpoon^{rel}	⥤		\rightbarharpoon^{rel}
⥪		\barleftharpoon^{rel}	⥧		\barrightharpoon^{rel}
⥊		\leftrightharpoon^{rel}	⥋		\rightleftharpoon^{rel}
⟋	⟋	\diagup^{rel}	⟍	⟍	\diagdown^{rel}
⊶		\originalof^{rel}	⊷		\imageof^{rel}
⟜		\revmultimap^{rel}	⊸	⊸	\multimap^{rel}
⧟		\revblackmultimap^{rel}	⧠		\blackmultimap^{rel}
↰	↰	\Lsh^{rel}, \ulsh	↱	↱	\Rsh^{rel}, \ursh
↲		\dlsh^{rel}	↳		\drsh^{rel}
↫	↫	\looparrowleft^{rel}, \looparrowupleft			
↬	↬	\looparrowright^{rel}, \looparrowupright			
↶		\looparrowdownleft^{rel}	↷		\looparrowdownright^{rel}
↺	↶	\curvearrowleft^{rel}, \curvearrowtopleft			
↻	↷	\curvearrowright^{rel}, \curvearrowtopright			
↭		\curvearrowleftright^{rel}, \curvearrowtopleftright			
↽		\curvearrowbotleft^{rel}	⇁		\curvearrowbotright^{rel}
⇋		\curvearrowbotleftright^{rel}	↻	↻	\circlearrowleft^{rel}
↻	↻	\circlearrowright^{rel}	⇜		\leftsquigarrow^{rel}
⇝	⇝	\rightsquigarrow^{rel}	⇜⇝		\leftrightsquigarrow^{rel}
↺		\lefttorightarrow^{rel}	↺		\righttoleftarrow^{rel}
↕		\uptodownarrow^{rel}	↻		\downtouparrow^{rel}

⇒ *Circles (matha).*

⊕	⊕	\oplus^{bin}	⊖	⊖	\ominus^{bin}, \circleddash
⊗	⊗	\otimes^{bin}	⨸		\odiv^{bin}
⊙	⊙	\odot^{bin}	◎		\ocirc^{bin}, \circledcirc
⊛		\oasterisk^{bin}, \circledast	⊛		\ocoasterisk^{bin}
⦵		\oleft^{bin}	⦶		\oright^{bin}
⦶		\otop^{bin}	⦵		\obot^{bin}, \operp
○		\ovoid^{bin}	⊘	⊘	\oslash^{bin}
⦸		\obackslash^{bin}	⟑		\otriangleup^{bin}

⇒ *Boxes (mathb).* The following boxed binary operators are just the twins of the corresponding circled binary operators of *matha*. One can remark that \Box is defined here (as an ordinary symbol).

⊞	⊞	\boxplus^{bin}	⊟	⊟	\boxminus^{bin}, \boxeddash
⊠	⊠	\boxtimes^{bin}	⨸		\boxdiv^{bin}
⊡	⊡	\boxdot^{bin}	⧈		\boxcirc^{bin}, \boxedcirc
⧆		\boxasterisk^{bin}, \boxedast	⧆		\boxcoasterisk^{bin}
⧇		\boxleft^{bin}	⧇		\boxright^{bin}
⧈		\boxtop^{bin}	⧈		\boxbot^{bin}, \boxperp
□		\boxvoid^{bin}	□		\Box^{ord}
⧄		\boxslash^{bin}	⧅		\boxbackslash^{bin}
⧋		\boxtriangleup^{bin}			

⇒ *Mayan numerals.* The presence of Mayan numerals (𝍠 · : ⁝ ⁞ |) in these series is related only to the history of the development of them. We wanted to have some special numerals in these series and Mayan ones where enough exotic to be worth implementing them.

$$\begin{bmatrix} \vdots \\ : \\ \cdot\!\!\mid\!\mid \end{bmatrix} + \begin{bmatrix} \mid \\ \cdot\!\mid \\ \mid\!\mid\!\mid \end{bmatrix} = \begin{bmatrix} \vdots\!\mid \\ \vdots\!\mid \\ \cdot\!\mid \end{bmatrix} \neq \text{𝍠}.$$

This line has been typesetted with

```
\mayadelimiters([,])
\maya{1251}+\maya{2135}=\maya{3386}\neq\mayadigit{0}.
```

Keeping these characters and the corresponding control sequences is still an open question.

⇒ *Large operators (mathx).*

$\sum$	$\sum$	`\sum`^{op}	$\prod$	$\prod$	`\prod`^{op}
$\coprod$	$\coprod$	`\coprod`^{op}	$\int$	$\int$	`\intop`^{op}
$\iint$		`\iintop`^{op}, `\iint`	$\iiint$		`\iiintop`^{op}, `\iiint`
$\oint$	$\oint$	`\ointop`^{op}, `\oint`	$\oiint$		`\oiintop`^{op}, `\oiint`
$+$		`\bigplus`^{op}	$\times$		`\bigtimes`^{op}
$\complement$		`\bigcomplementop`^{op}	$\bigcap$	$\bigcap$	`\bigcap`^{op}
$\bigcup$	$\bigcup$	`\bigcup`^{op}	$\biguplus$	$\biguplus$	`\biguplus`^{op}
$\bigsqcap$		`\bigsqcap`^{op}	$\bigsqcup$	$\bigsqcup$	`\bigsqcup`^{op}
$\biguplus$		`\bigsquplus`^{op}	$\bigwedge$	$\bigwedge$	`\bigwedge`^{op}
$\bigvee$	$\bigvee$	`\bigvee`^{op}	$\bigcurlywedge$		`\bigcurlywedge`^{op}
$\curlyvee$		`\bigcurlyvee`^{op}			

⇒ *Big circles (mathx).* Here we find the large versions of circled operators of *matha*.

$\bigoplus$	$\bigoplus$	`\bigoplus`^{op}	$\bigominus$		`\bigominus`^{op}
$\bigotimes$	$\bigotimes$	`\bigotimes`^{op}	$\bigodiv$		`\bigodiv`^{op}
$\bigodot$	$\bigodot$	`\bigodot`^{op}	$\bigocirc$		`\bigocirc`^{op}
$\bigoast$		`\bigoasterisk`^{op}	$\bigocoast$		`\bigocoasterisk`^{op}
$\bigoleft$		`\bigoleft`^{op}	$\bigoright$		`\bigoright`^{op}
$\bigotop$		`\bigotop`^{op}	$\bigobot$		`\bigobot`^{op}, `\bigoperp`
$\bigovoid$		`\bigovoid`^{op}	$\bigoslash$		`\bigoslash`^{op}
$\bigobackslash$		`\bigobackslash`^{op}	$\bigotriangleup$		`\bigotriangleup`^{op}

⇒ *Big boxes (mathx).* Here we find the large versions of boxed operators of *mathb*.

$\bigboxplus$		`\bigboxplus`^{op}	$\bigboxminus$		`\bigboxminus`^{op}
$\bigboxtimes$		`\bigboxtimes`^{op}	$\bigboxdiv$		`\bigboxdiv`^{op}
$\bigboxdot$		`\bigboxdot`^{op}	$\bigboxcirc$		`\bigboxcirc`^{op}
$\bigboxast$		`\bigboxasterisk`^{op}	$\bigboxcoast$		`\bigboxcoasterisk`^{op}
$\bigboxleft$		`\bigboxleft`^{op}	$\bigboxright$		`\bigboxright`^{op}
$\bigboxtop$		`\bigboxtop`^{op}	$\bigboxbot$		`\bigboxbot`^{op}, `\bigboxperp`
$\bigboxvoid$		`\bigboxvoid`^{op}	$\bigboxslash$		`\bigboxslash`^{op}
$\bigboxbackslash$		`\bigboxbackslash`^{op}	$\bigboxtriangleup$		`\bigboxtriangleup`^{op}

⇒ *Delimiters (matha/mathx).* The following delimiters have their smaller form in *matha* and larger ones in *mathx*.

(	(	(^{other}	)	)	)^{other}
[	[	[^{other}	]	]	]^{other}
{	{	\lbrace^{open}, \{	}	}	\rbrace^{close}, \}
⟦		\ldbrack^{open}, \lsemantic	⟧		\rdbrack^{close}, \rsemantic
⟨	⟨	\langle^{open}	⟩	⟩	\rangle^{close}
\	\	\backslash^{ord}	/	/	/^{other}
|	|	\vert^{ord}	|	|	|^{other}
‖	‖	\Vert^{ord}, \\|	⦀		\vvvert^{ord}
↑	↑	\uparrow^{rel}	↓	↓	\downarrow^{rel}
↕	↕	\updownarrow^{rel}	⇑	⇑	\Uparrow^{rel}
⇓	⇓	\Downarrow^{rel}	⇕	⇕	\Updownarrow^{rel}

⇒ *Delimiters (mathb/mathx).*

⦅	⦅	\lgroup^{open}	⦆	⦆	\rgroup^{close}
⌈	⌈	\lceil^{open}	⌉	⌉	\rceil^{close}
⌊	⌊	\lfloor^{open}	⌋	⌋	\rfloor^{close}
⏐		\thickvert^{ord}			

⇒ *Delimiters (mathx/mathx).*

⧼		\lfilet^{open}	⧽		\rfilet^{close}
⎛	⌒	\lmoustache^{open}	⎞	⌒	\rmoustache^{close}

⇒ *Pieces for over-under-braces and such (mathx). Mathx* series provide the following bricks:

⎧	⎧	\braceld^{ord}	⏜		\bracemd^{ord}
⎩	⎩	\bracerd^{ord}	-		\bracexd^{ord}
⎨	⎨	\bracelu^{ord}	⏝		\bracemu^{ord}
⎭	⎭	\braceru^{ord}	-		\bracexu^{ord}

The control sequences \overbrace, etc., have been defined as suggested by Matthias Clasen and Ulrik Vieth in *newmath*. For instance:

$\overbrace{abcde}$ (\overbrace{abcde}), $\underbrace{abcde}$ (\underbrace{abcde}),

$\overgroup{abcde}$ (\overgroup{abcde}), $\undergroup{abcde}$ (\undergroup{abcde}).

⇒ *Extensible accents (mathx).*

^		\widehat^{other}	ˇ		\widecheck^{other}
~		\widetilde^{other}	–		\widebar^{other}
→		\widearrow^{other}	⏜		\wideparen^{other}
√		\sqrt^{other}			

⇒ *Unsupported stuff (mathum10 and mathub10).* First something under construction

⥸	\strictif^{rel}	⥹	\strictfi^{rel}
⥺	\strictiff^{rel}		

$$A \strictif B \strictfi C, \qquad E \strictiff F.$$

First some geometrical shapes (names are not to be taken too seriously):

□	\geometricsquare^{ord}	⬠	\geometricpentagon^{ord}
⬡	\geometrichexagon^{ord}	⯃	\geometricoctogon^{ord}
◇	\vargeometricsquare^{ord}	⬠	\vargeometricpentagon^{ord}
⬡	\vargeometrichexagon^{ord}	⯃	\vargeometricoctogon^{ord}
☆	\geometricstar^{ord}	★	\geometricblackstar^{ord}
✡	\vargeometricstar^{ord}	★	\vargeometricblackstar^{ord}

Then, triangles again (names are not to be taken too seriously):

△	\mediumtriangleup^{bin}	▽	\mediumtriangledown^{bin}
◁	\mediumtriangleleft^{bin}	▷	\mediumtriangleright^{bin}
▲	\mediumblacktriangleup^{bin}	▼	\mediumblacktriangledown^{bin}
◀	\mediumblacktriangleleft^{bin}	▶	\mediumblacktriangleright^{bin}
△	\largetriangleup^{bin}	▽	\largetriangledown^{bin}
◁	\largetriangleleft^{bin}	▷	\largetriangleright^{bin}
▲	\largeblacktriangleup^{bin}	▼	\largeblacktriangledown^{bin}
◀	\largeblacktriangleleft^{bin}	▶	\largeblacktriangleright^{bin}

Others (names are not to be taken too seriously). Among the many remarks I can do about the following symbols: "Q" things may originate from the St Mary Road font, but I can't remember why it has been extended to four symbols; dotted intersection and union signs have became classical; arrowed cup sign can be found in Unicode; a bold complement sign is closer to sixties french uses; bold intersection and union come from I don't know where; small versions of "smile" and "frown" come from AMS choices (...), it is certainly the same for the next symbols up to the asterisks; these asterisks are not useful; Bourbaki's Z is self explainatory; the maltese cross comes from AMS and I choosed to design it with arithmetical bounds; the nuclear sign for my own distraction; I've made some attempts in drawing anew cards suits (heart, diamond, spade, club [to be revised!] and joker [a more or less classical version and a design coming from Grimaud cards]) and dices (from 1 to 6 in two versions); the greek motive comes from the embellishment of my favorite pen; the ghanean motive from some commercial font (ITC Kokoa? I am not sure of that) based on traditional african motives, and thus may (should) be free of rights. The two last motives have been designed as fleurons in order to decorate my lecture notes.

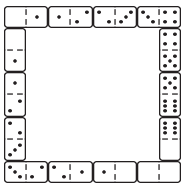
⍉	\nwQ^{ord}	⍀	\neQ^{ord}
⍁	\swQ^{ord}	⍄	\seQ^{ord}
⩀	\capdot^{bin}	⊍	\cupdot^{bin}
⊡	\sqcapdot^{bin}	⊡	\sqcupdot^{bin}
⊎	\cuparrow^{bin}	∁	\boldcomplement^{op}
∩	\boldcap^{bin}	∪	\boldcup^{bin}
⌣ ⌣	\smallsmile^{bin}	⌢ ⌢	\smallfrown^{bin}

‵	‵	`\backprime`^{ord}	⌐		`\reverseneg`^{ord}
※		`\smashprod`^{bin}	≅		`\simsimbar`^{rel}
≇		`\notsimsimbar`^{rel}	≂		`\barsim`^{rel}
≁		`\notbarsim`^{rel}	≀		`\simvert`^{rel}
∽		`\revsim`^{rel}	≌		`\revsimbar`^{rel}
*		`\upperasterisk`^{ord}	*		`\lowerasterisk`^{ord}
* * *		`\tripleasterisks`^{ord}	Ƨ		`\BourbakiZ`^{ord}
✠	✠	`\maltese`^{ord}	⋇		`\varmaltese`^{ord}
✠		`\maltesegeometric`^{ord}	⊗		`\nuclear`^{ord}
♡	♡	`\heartsuit`^{ord}	♢	♢	`\diamondsuit`^{ord}
♠	♠	`\spadesuit`^{ord}	♣	♣	`\clubsuit`^{ord}
⍟		`\jokersuit`^{ord}	⚽		`\varjokersuit`^{ord}
⌸		`\greekmotive`^{ord}	⌾		`\ghaneanmotive`^{ord}

I don't really like games of chance but it is funny to typeset

⚃ ⚁ ⚀ or ⚂ ⚄ ⚅

Control sequences `\dice` (left sample) and `\Dice` (right sample) have only one argument which should be a numeral in $\{1, 2, 3, 4, 5, 6\}$ (⚀⚁⚂⚃⚄⚅, ⚅⚄⚃⚂⚁⚀). About dominos, there is a control sequence named `\domino` with two arguments. The first argument is a numeral in $\{0, 1, 2, 3, 4, 5, 6\}$, the second one is a single letter in { l, r u, d} (left, right, up, down). For example:



Some arrows (double vertical arrows should be defined as extensible symbols):

↾	`\nuparrow`^{rel}	↿	`\ndownarrow`^{rel}
↕	`\nupdownarrow`^{rel}	⇑	`\nUparrow`^{rel}
⇓	`\nDownarrow`^{rel}	⇕	`\nUpdownarrow`^{rel}
⇐	`\lefttriplearrow`^{rel}	⇒	`\righttriplearrow`^{rel}
⇔	`\leftrighttriplearrow`^{rel}		

Triple horizontal arrows can be extended with `\equiv` and `\joinrel` $A \Longrightarrow B$, and thus, negated too $A \not\Longrightarrow B$. But this is not really fine (too large length).

Other circled operators (names are not to be taken too seriously):

⊤	`\otruc`^{bin}	⊥	`\ocurt`^{bin}
⊙	`\obullet`^{bin}	⍟	`\ostar`^{bin}
⍟	`\ovarstar`^{bin}	⊽	`\otriangledown`^{bin}
◁	`\otriangleleft`^{bin}	▷	`\otriangleright`^{bin}
⊖	`\odotminus`^{bin}	⊖	`\ominusdot`^{bin}
⊖	`\ohoriz`^{bin}	⦶	`\overt`^{bin}
⊕	`\ocross`^{bin}	⊗	`\oacross`^{bin}
⦸	`\oless`^{bin}	⦸	`\ogreater`^{bin}

⦶	\owedge^{bin}	⦷	\ovee^{bin}
◐	\oblackleft^{bin}	◑	\oblackright^{bin}
◓	\oblackup^{bin}	◒	\oblackdown^{bin}
◪	\oblackul^{bin}	◹	\oblackur^{bin}
◮	\oblackll^{bin}	◭	\oblacklr^{bin}
☯	\oyingyang^{bin}	☢	\oradioactive^{bin}
☮	\opeacelove^{bin}	⊜	\oequal^{bin}

And the corresponding boxed operators (names are not to be taken too seriously):

⊞	\boxtruc^{bin}	⊞	\boxcurt^{bin}
⊡	\boxbullet^{bin}	⊠	\boxstar^{bin}
⊠	\boxvarstar^{bin}	⊡	\boxtriangledown^{bin}
⊡	\boxtriangleleft^{bin}	⊡	\boxtriangleright^{bin}
⊡	\boxdotminus^{bin}	⊡	\boxminusdot^{bin}
⊟	\boxbar^{bin}	⊞	\boxvert^{bin}
⊞	\boxcross^{bin}	⊠	\boxacross^{bin}
⊠	\boxless^{bin}	⊠	\boxgreater^{bin}
⊠	\boxwedge^{bin}	⊠	\boxvee^{bin}
◧	\boxblackleft^{bin}	◨	\boxblackright^{bin}
⬓	\boxblackup^{bin}	⬓	\boxblackdown^{bin}
◩	\boxblackul^{bin}	◪	\boxblackur^{bin}
◪	\boxblackll^{bin}	◩	\boxblacklr^{bin}
☯	\boxyingyang^{bin}	☢	\boxradioactive^{bin}
☮	\boxpeacelove^{bin}	⊟	\boxequal^{bin}

⇒ *Unsupported stuff (mathuxm10 and mathuxb10).* The following symbols are rather unusual for me, but they may appear elsewhere (names are not to be taken too seriously):

⨀		\bigcapdot^{op}	⨃		\bigcupdot^{op}
⨅		\bigsqcapdot^{op}	⨆		\bigsqcupdot^{op}
⨈		\bigcuparrow^{op}	⫪		\bigtop^{op}
⫫		\bigbot^{op}	⨊		\bigZ^{op}
⨄	△	\bigtriangleup^{op}	⨄	▽	\bigtriangledown^{op}
⨌		\oiiintop^{op}	⨍		\ointctrclockwiseop^{op}
∲		\ointclockwiseop^{op}	⨎		\intclockwiseop^{op}
⨖		\sqintop^{op}	⨐		\sqintctrclockwiseop^{op}
⨕		\sqintclockwiseop^{op}			

Other large circled operators (names are not to be taken too seriously):

⨂	\bigotruc^{op}	⨁	\bigocurt^{op}
⨀	\bigobullet^{op}	⍟	\bigostar^{op}
⍟	\bigovarstar^{op}	⨁	\bigotriangledown^{op}
⨁	\bigotriangleleft^{op}	⨁	\bigotriangleright^{op}
⨀	\bigodotminus^{op}	⨀	\bigominusdot^{op}
⨁	\bigohoriz^{op}	⨁	\bigovert^{op}
⨁	\bigocross^{op}	⨂	\bigoacross^{op}
⨁	\bigoless^{op}	⨁	\bigogreater^{op}

⨀	`\bigowedge`^{op}	⨁	`\bigovee`^{op}
◐	`\bigoblackleft`^{op}	◑	`\bigoblackright`^{op}
◒	`\bigoblackup`^{op}	◓	`\bigoblackdown`^{op}
◔	`\bigoblackul`^{op}	◕	`\bigoblackur`^{op}
◔	`\bigoblackll`^{op}	◕	`\bigoblacklr`^{op}
☯	`\bigoyingyang`^{op}	☢	`\bigoradioactive`^{op}
☮	`\bigopeacelove`^{op}	⊜	`\bigoequal`^{op}

And the corresponding large boxed operators (names are not to be taken too seriously):

⧈	`\bigboxtruc`^{op}	⧈	`\bigboxcurt`^{op}
⨀	`\bigboxbullet`^{op}	★	`\bigboxstar`^{op}
✶	`\bigboxvarstar`^{op}	▽	`\bigboxtriangledown`^{op}
◁	`\bigboxtriangleleft`^{op}	▷	`\bigboxtriangleright`^{op}
⨥	`\bigboxdotminus`^{op}	⨪	`\bigboxminusdot`^{op}
⧈	`\bigboxhoriz`^{op}	⧈	`\bigboxvert`^{op}
⧈	`\bigboxcross`^{op}	⊠	`\bigboxacross`^{op}
⧅	`\bigboxless`^{op}	⧅	`\bigboxgreater`^{op}
△	`\bigboxwedge`^{op}	⧆	`\bigboxvee`^{op}
◧	`\bigboxblackleft`^{op}	◨	`\bigboxblackright`^{op}
⬒	`\bigboxblackup`^{op}	⬓	`\bigboxblackdown`^{op}
◪	`\bigboxblackul`^{op}	◪	`\bigboxblackur`^{op}
◪	`\bigboxblackll`^{op}	◪	`\bigboxblacklr`^{op}
☯	`\bigboxyingyang`^{op}	☢	`\bigboxradioactive`^{op}
⧈	`\bigboxpeacelove`^{op}	⧈	`\bigboxequal`^{op}

2. Special constructions

The special constructions described here are defined in the file `mathabx.dcl`. Usual plainTEX/LATEX constructions should be supported if not replaced by some *mathabx* symbol.

- The control sequences `\overrightarrow`, etc., have been defined anew (*see* `mathabx.dcl`). They will certainly be improved.

$$\overrightarrow{abcde}\quad\overrightarrow{\overrightarrow{abcde}}\quad\overrightarrow{\overrightarrow{\overrightarrow{abcde}}}$$

$\overrightarrow{abcde}$	`\overrightarrow`	$\overleftarrow{abcde}$	`\overleftarrow`
$\overleftrightarrow{abcde}$	`\overleftrightarrow`	$\underrightarrow{abcde}$	`\underrightarrow`
$\underleftarrow{abcde}$	`\underleftarrow`	$\underleftrightarrow{abcde}$	`\underleftrightarrow`
$\overRightarrow{abcde}$	`\overRightarrow`	$\overLeftarrow{abcde}$	`\overLeftarrow`
$\overLeftRightarrow{abcde}$	`\overLeftRightarrow`	$\underRightarrow{abcde}$	`\underRightarrow`
$\underLeftarrow{abcde}$	`\underLeftarrow`	$\underLeftRightarrow{abcde}$	`\underLeftRightarrow`

- The built-in accent `\wideparen` (introduced first by Yannis Haralambous) allows to build other accent-like control sequences.

$\overset{\circ}{\frown}{abcde}$	`\widering`	$\overset{\cdot}{\frown}{abcde}$	`\widedot`
$\overset{\cdot\cdot}{\frown}{abcde}$	`\wideddot`	$\overset{\cdot\cdot\cdot}{\frown}{abcde}$	`\widedddot`
$\overset{\cdot\cdot\cdot\cdot}{\frown}{abcde}$	`\widedddddot`		

- At last, some symbols like `\int`, `\bigcomplement`, `\surd`, must be defined by some `\def` because of limits or such.

$$\int_a^b f(x)\,\mathrm{d}x, \quad \complement_\Omega A, \quad \sqrt{a}, \qquad \int_a^b f(x)\,\mathrm{d}x, \quad \complement_\Omega A, \quad \sqrt{a}.$$

But it seems clear when viewing what is done elsewhere that the already too large mathabx set should (really?) be extended. This may be done by combining already existing symbols. If not, I would once again take my pen, some paper and my keyboard if necessary.

3. Global installation

In the *mathabx.me* distribution, MetaFont source files (`xxx.mf`) are all located in the `source/` directory. They may be moved to a (new) subdirectory named `mathabx` of `$TEXMF/fonts/source/public/`, thus in

```
$TEXMF/fonts/source/public/mathabx/
```

where `$TEXMF` stands for the root directory of the TEXMF distribution of the computer. PlainTEX/LATEXinput files are all located in the `texinputs` directory of this distribution. The three files `mathabx.tex`, `mathabx.sty` and `mathabx.dcl` may be moved to the directory

```
$TEXMF/tex/generic/misc/
```

(other location may be also fine). Other TEX files are there for documentation. They can be removed.

At last, the TEXMF system needs to know that new files have been added. This can be done by executing from a console `texhash` or such, some command that refreshes the TEXMF database. We don't provide more informations on this last subject since it may depend on every particular TEXMF distribution and computer system.

If a previous *mathabx* distribution has been already installed, please remove every bitmap fonts (`xxx.yyypk`) and metrics (`xxx.tfm`) related to *mathabx* (only!) since all of them may change from a distribution to another.

We won't write anything about local installation (on Unices systems for instance), nor about Type 1 conversions and installation of the *mathabx* fonts. One can find informations about these two last topics on the World Wide Web (but maybe in japanese).

4. Use with plainTEX

The basic input file is `mathabx.tex`. It requires `mathabx.dcl` which is common to plainTEX and LATEX. So one should type

```
\input mathabx.tex
```

at the beginning of his (her) plainTEX document. This sets up all the symbols previously described and defines 3 new families of mathematical symbols whose numbers

are `\mathafam`, `\mathbfam` and `\mathxfam`. Pointsizes are 10 pt, *i.e.*, textstyle is 10 pt, scriptstyle is 7 pt and scriptscriptstyle is 5 pt for `\mathafam` and `\mathbfam` families. For `\mathxfam` the three styles correspond to a pointsize equal to 10 pt as for `cmex` in plainTEX. Changing pointsizes is easy since any plainTEXuser know how to do so (one can also look into `mathabx.tex` to make sure). Remember that setting the control sequence `\proofmode` to a known value before inputing `mathabx.tex` would lead to the verbose mode as illustrated in Section 1 of this document.

5. Use with LATEX

The basic package is `mathabx.sty`. It requires `mathabx.dcl` which is common to plainTEX and LATEX. So one should type

```
\usepackage{mathabx}
```

in the preamble of his (her) LATEX document. This sets up all the symbols previously described and defines 3 new families of mathematical symbols whose LATEX names are `matha`, `mathb` and `mathx` (according to LATEX font selection scheme). These families behave as expected with pointsize changes. The possible options of the `mathabx` package are `matha`, `mathb`, `mathx`, `excsale`, `extra` and `unsupported`. the three first options allow to select which families would be actually defines. For instance

```
\usepackage[matha,mathx]{mathabx}
```

ignores the *mathb* family and load only *matha* and *mathx* families. Remember that no option means that the three families would be loaded. No individual symbol selection has been setted. If one wants to use only, say, a couple of symbols in the *mathabx* series, he (she) would have to it by him(her)self. The option `exscale` allows pointsize changes for large operators and should provide a correct behavior for `\big`, etc., control sequences—this option performs almost the same thing as the `exscale` package. The option `extra` allows the definition of special constructions like `\underleftarrow` and such which may interfere with AMS packages. The option `unsupported` loads also unsupported stuff.

6. Various trials

We begin by some meaningless expressions:

$$G \lhd H \trianglelefteq A \trianglerighteq B \rhd C$$
$$|G| \nlhd |H| \ntrianglelefteq |A| \ntrianglerighteq |B| \nrhd |C|.$$

Then we look at variations with mathematical style:

$$\infty^{\infty^{\infty}} \qquad \infty^{\infty^{\infty}} \qquad \in^{\in^{\in}} \qquad \subset^{\subset^{\subset}} \qquad \subseteq^{\subseteq^{\subseteq}} \qquad <^{<^{<}} \qquad \sqrt{x}^{\sqrt{x}^{\sqrt{x}}}$$

The first `\infty` symbol is from *matha*, the next one is the *Computer Modern* one.

Other trials with sometimes *Computer Modern* symbols for comparison:

$$a \twoheadrightarrow b \longleftarrow c \rightarrowtail d$$
$$\Gamma\, \Sigma\, \Sigma\, \Pi\, \Pi\, \amalg\, D,$$
$$f : X \circlearrowleft, \qquad g : X \dashrightarrow Y, \qquad g : X \Rightarrow Y, \qquad X \longleftarrow Z \Leftarrow W$$
$$\frac{\partial f}{\partial x}(x) \simeq \frac{\partial f}{\partial x}(x) \qquad \flat\flat\natural\natural\sharp\sharp\text{bof bof} \qquad \sqrt[2]{9} = \sqrt[3]{27} = \sqrt[4]{81}$$
$$\|T(h)f - f\| = \|T(h)f - f\|$$
$$A \cap B \cup C \uplus D \vee E \wedge F$$
$$A \sqcap B \sqcup C \uplus D \curlyvee E \curlywedge F \trianglelefteq G \trianglerighteq F \curlyvee H \curlywedge I$$
$$\dagger\, \dagger\, \ddagger\, \ddagger \qquad A^{\dagger^\dagger} \cdot A^{\dagger\dagger} \qquad A \circledast A \circledast \{y\} \star [x] * (z) \qquad \surd\surd$$
$$\forall x \in y^\perp,\ \exists S \subseteq R,\ \exists x,\ (\exists x), \quad z \cap y,\ x \in y$$
$$f \mapsto g \longmapsto h, \qquad f \hookrightarrow g \hookleftarrow h, \qquad A \Longmapsto B \Longleftarrow C, \qquad a \leftsquigarrow b \leftrightsquigarrow c \rightsquigarrow d.$$

Integrals in displaystyle then in textstyle (I don't want to forget that these signs are derived from the letter "S" even if I draw them my way):

$$\int\int\int_0^t f \circ g(x)\,\mathrm{d}x = \int\iint_0^t f \circ g(x)\,\mathrm{d}x = \iiint_0^t f \circ g(x)\,\mathrm{d}x$$
$$\int_0^t \oint_C f \circ g(x)\,\mathrm{d}x = \int_0^t \oint_C f \circ g(x)\,\mathrm{d}x = \oiint_S f \circ g(x)\,\mathrm{d}x$$
$$\textstyle\int\int\int_0^t f \circ g(x)\,\mathrm{d}x = \int\iint_0^t f \circ g(x)\,\mathrm{d}x = \iiint_0^t f \circ g(x)\,\mathrm{d}x$$
$$\textstyle\int_0^t \oint_C f \circ g(x)\,\mathrm{d}x = \int_0^t \oint_C f \circ g(x)\,\mathrm{d}x = \oiint_S f \circ g(x)\,\mathrm{d}x$$

Sums and products, etc., in displaystyle:

$$\prod_{i=0}^{i=n}\prod_{j=0}^{j=n}\prod_{k=0}^{k=n}\Gamma_k^{ij} = \prod_{i=0}^{i=n}\coprod_{j=0}^{j=n}\prod_{k=0}^{k=n}\Gamma_k^{ij} = \coprod_{i=0}^{i=n}\coprod_{j=0}^{j=n}\coprod_{k=0}^{k=n}\Gamma_k^{ij} = \prod_{i=0}^{i=n}\coprod_{j=0}^{j=n}\prod_{k=0}^{k=n}\Gamma_k^{ij}$$
$$\prod_{i=0}^{i=n}\prod_{j=0}^{j=n}\prod_{k=0}^{k=n}\Gamma_k^{ij} = \left(\prod_{i=0}^{i=n}\sum_{j=0}^{j=n}\prod_{k=0}^{k=n}\Gamma_k^{ij}\right) = \left[\sum_{i=0}^{i=n}\sum_{j=0}^{j=n}\sum_{k=0}^{k=n}\Gamma_k^{ij}\right] = \left[\sum_{i=0}^{i=n}\sum_{j=0}^{j=n}\sum_{k=0}^{k=n}\Gamma_k^{ij}\right]$$
$$\bigcup_{i=0}^{i=n}\bigcap_{j=0}^{j=n}\bigcup_{k=0}^{k=n}\Gamma_k^{ij} = \bigcup_{i=0}^{i=n}\bigvee_{j=0}^{j=n}\bigcup_{k=0}^{k=n}\Gamma_k^{ij} = \bigcup_{i=0}^{i=n}\bigwedge_{j=0}^{j=n}\bigcup_{k=0}^{k=n}\Gamma_k^{ij} = \bigvee_{i=0}^{i=n}\bigwedge_{j=0}^{j=n}\bigvee_{k=0}^{k=n}\Gamma_k^{ij}$$

Sums and products, etc., in textstyle:

$$\textstyle\prod\prod\prod\Gamma_k^{ij} = \prod\coprod\prod\Gamma_k^{ij} = \coprod\coprod\coprod\Gamma_k^{ij} = \prod\coprod\prod\Gamma_k^{ij}$$
$$\textstyle\prod\prod\prod\Gamma_k^{ij} = (\prod\sum\prod\Gamma_k^{ij}) = [\sum\sum\sum\Gamma_k^{ij}] = [\sum\sum\sum\Gamma_k^{ij}]$$
$$\textstyle\bigcup\bigcap\bigcup\Gamma_k^{ij} = \bigcup\bigvee\bigcup\Gamma_k^{ij} = \bigcup\bigwedge\bigcup\Gamma_k^{ij} = \bigvee\bigwedge\bigvee\Gamma_k^{ij}$$

7. Delimiters

The whole set of extensible delimiters is presented below. Some of those delimiters are quite close to *Computer Modern*'s ones, for instance parentheses are almost the same. By now there are a few differences. Left and right groups are fully supported, i.e. every sizes exist. Moustaches are built in the font but not in a satisfactory way, as one may see below. Some vertical lines are not supported, these are the ones that could be built with various extension moduli as in *Computer Modern*.

$$(X,X)=[X,X]=\{X,X\}=\langle X^c,X^c\rangle\equiv[X^c,X^c]=\ulcorner X\urcorner=\llcorner X\lrcorner=\ulcorner X\lrcorner=\llcorner X\urcorner$$
$$(\mathrm{H}\mid\mathrm{O})=[\mathrm{H}\mid\mathrm{O}]=\{\mathrm{H}\mid\mathrm{O}\}=\langle\mathrm{H}\mid\mathrm{O}\rangle=[\![\mathrm{H}\mid\mathrm{O}]\!]=\lceil\mathrm{H}\mid\mathrm{O}\rceil=\lfloor\mathrm{H}\mid\mathrm{O}\rfloor$$
$$=(\mathrm{H}\mid\mathrm{O})=\left(\begin{array}{c}\mathrm{H}\mid\mathrm{O}\end{array}\right)=|\mathrm{H}|=\|\mathrm{H}\|=|||\mathrm{H}|||=\uparrow\mathrm{H}\updownarrow\mathrm{H}\downarrow=\Uparrow\mathrm{H}\Updownarrow\mathrm{H}\Downarrow=\sqrt{|}$$
$$(\mathrm{H}\mid\mathrm{O})=\big[\mathrm{H}\mid\mathrm{O}\big]=\big\{\mathrm{H}\mid\mathrm{O}\big\}=\big\langle\mathrm{H}\mid\mathrm{O}\big\rangle=\big[\!\big[\mathrm{H}\mid\mathrm{O}\big]\!\big]=\big\lceil\mathrm{H}\mid\mathrm{O}\big\rceil=\big\lfloor\mathrm{H}\mid\mathrm{O}\big\rfloor$$
$$=\big(\mathrm{H}\mid\mathrm{O}\big)=\int\mathrm{H}\mid\mathrm{O}\Big\}=\big|\mathrm{H}\big|=\big\|\mathrm{H}\big\|=\big|||\mathrm{H}|||\big=\uparrow\mathrm{H}\updownarrow\mathrm{H}\downarrow=\Uparrow\mathrm{H}\Updownarrow\mathrm{H}\Downarrow=\sqrt{|}$$
$$\Big(\mathrm{H}\;\Big|\;\mathrm{O}\Big)=\Big[\mathrm{H}\;\Big|\;\mathrm{O}\Big]=\Big\{\mathrm{H}\;\Big|\;\mathrm{O}\Big\}=\Big\langle\mathrm{H}\;\Big|\;\mathrm{O}\Big\rangle=\Big[\!\Big[\mathrm{H}\;\Big|\;\mathrm{O}\Big]\!\Big]=\Big\lceil\mathrm{H}\;\Big|\;\mathrm{O}\Big\rceil=\Big\lfloor\mathrm{H}\;\Big|\;\mathrm{O}\Big\rfloor$$
$$=\Big(\mathrm{H}\;\Big|\;\mathrm{O}\Big)=\int\mathrm{H}\;\Big|\;\mathrm{O}\Big\}=\Big|\mathrm{H}\Big|=\Big\|\mathrm{H}\Big\|=\Big|||\mathrm{H}|||\Big=\uparrow\mathrm{H}\updownarrow\mathrm{H}\downarrow=\Uparrow\mathrm{H}\Updownarrow\mathrm{H}\Downarrow=\sqrt{|}$$
$$\Big(\mathrm{H}\;\Big|\;\mathrm{O}\Big)=\Big[\mathrm{H}\;\Big|\;\mathrm{O}\Big]=\Big\{\mathrm{H}\;\Big|\;\mathrm{O}\Big\}=\Big\langle\mathrm{H}\;\Big|\;\mathrm{O}\Big\rangle=\Big[\!\Big[\mathrm{H}\;\Big|\;\mathrm{O}\Big]\!\Big]=\Big\lceil\mathrm{H}\;\Big|\;\mathrm{O}\Big\rceil=\Big\lfloor\mathrm{H}\;\Big|\;\mathrm{O}\Big\rfloor$$
$$=\Big(\mathrm{H}\;\Big|\;\mathrm{O}\Big)=\int\mathrm{H}\;\Big|\;\mathrm{O}\Big\}=\Big|\mathrm{H}\Big|=\Big\|\mathrm{H}\Big\|=\Big|||\mathrm{H}|||\Big=\uparrow\mathrm{H}\updownarrow\mathrm{H}\downarrow=\Uparrow\mathrm{H}\Updownarrow\mathrm{H}\Downarrow=\sqrt{|}$$
$$\Big(\mathrm{H}\;\Big|\;\mathrm{O}\Big)=\Big[\mathrm{H}\;\Big|\;\mathrm{O}\Big]=\Big\{\mathrm{H}\;\Big|\;\mathrm{O}\Big\}=\Big\langle\mathrm{H}\;\Big|\;\mathrm{O}\Big\rangle=\Big[\!\Big[\mathrm{H}\;\Big|\;\mathrm{O}\Big]\!\Big]=\Big\lceil\mathrm{H}\;\Big|\;\mathrm{O}\Big\rceil=\Big\lfloor\mathrm{H}\;\Big|\;\mathrm{O}\Big\rfloor$$
$$=\Big(\mathrm{H}\;\Big|\;\mathrm{O}\Big)=\int\mathrm{H}\;\Big|\;\mathrm{O}\Big\}=\Big|\mathrm{H}\Big|=\Big\|\mathrm{H}\Big\|=\Big|||\mathrm{H}|||\Big=\uparrow\mathrm{H}\updownarrow\mathrm{H}\downarrow=\Uparrow\mathrm{H}\Updownarrow\mathrm{H}\Downarrow=\sqrt{|}$$

8. Accents and wide accents

Here are some basic accents.

`\ring o` $\mathring{o}$, `\dot o` $\dot{o}$, `\ddot o` $\ddot{o}$, `\dddot o` $\dddot{o}$, `\ddddot o` $\ddddot{o}$,

Thus,

$$\dddot{y}-4\ddot{y}+5x\ddot{y}+f(x)\dot{y}=g(x)\in\mathring{C}$$

Here we have extensible accents. Control sequences `\oldxxx` just invoke former symbols when they exist, these control sequences are defined only for this test file.

`\widehat`	$\widehat{I} = \widehat{H} = \widehat{II} = \widehat{III} = \widehat{IIII} = \widehat{IIIII} = \widehat{IIIIII} = \widehat{IIIIIII}$
`\oldwidehat`	$\widehat{I} = \widehat{H} = \widehat{II} = \widehat{III} = \widehat{IIII} = \widehat{IIIII} = \widehat{IIIIII} = \widehat{IIIIIII}$
`\widecheck`	$\widecheck{I} = \widecheck{H} = \widecheck{II} = \widecheck{III} = \widecheck{IIII} = \widecheck{IIIII} = \widecheck{IIIIII} = \widecheck{IIIIIII}$
`\widetilde`	$\widetilde{I} = \widetilde{H} = \widetilde{II} = \widetilde{III} = \widetilde{IIII} = \widetilde{IIIII} = \widetilde{IIIIII} = \widetilde{IIIIIII}$
`\oldwidetilde`	$\widetilde{I} = \widetilde{H} = \widetilde{II} = \widetilde{III} = \widetilde{IIII} = \widetilde{IIIII} = \widetilde{IIIIII} = \widetilde{IIIIIII}$
`\widearrow`	$\vec{I} = \vec{H} = \overrightarrow{II} = \overrightarrow{III} = \overrightarrow{IIII} = \overrightarrow{IIIII} = \overrightarrow{IIIIII} = \overrightarrow{IIIIIII}$
`\wideparen`	$\widehat{I} = \widehat{H} = \widehat{II} = \widehat{III} = \widehat{IIII} = \widehat{IIIII} = \widehat{IIIIII} = \widehat{IIIIIII}$
`\widering`	$\mathring{I} = \mathring{H} = \mathring{II} = \mathring{III} = \mathring{IIII} = \mathring{IIIII} = \mathring{IIIIII} = \mathring{IIIIIII}$
`\widedot`	$\dot{I} = \dot{H} = \dot{II} = \dot{III} = \dot{IIII} = \dot{IIIII} = \dot{IIIIII} = \dot{IIIIIII}$
`\wideddot`	$\ddot{I} = \ddot{H} = \ddot{II} = \ddot{III} = \ddot{IIII} = \ddot{IIIII} = \ddot{IIIIII} = \ddot{IIIIIII}$
`\widedddot`	$\dddot{I} = \dddot{H} = \dddot{II} = \dddot{III} = \dddot{IIII} = \dddot{IIIII} = \dddot{IIIIII} = \dddot{IIIIIII}$
`\widedddot`	$\ddddot{I} = \ddddot{H} = \ddddot{II} = \ddddot{III} = \ddddot{IIII} = \ddddot{IIIII} = \ddddot{IIIIII} = \ddddot{IIIIIII}$
`\widebar`	$\bar{I} = \bar{H} = \overline{II} = \overline{III} = \overline{IIII} = \overline{IIIII} = \overline{IIIIII} = \overline{IIIIIII}$
`\overleftarrow` is not of accent type	$\overleftarrow{IIIIIIIIIIIIIIIIIIIIIIII}$

According to Matthias Clasen's construction: `\overbrace`, `\underbrace`, `\overgroup`, `\undergroup`

$$\overbrace{\underbrace{HHHHHHHHHH}_{AAAAAAAAAAA}}^{AAAAAAAAAAA} \qquad \overbrace{\underbrace{HHHHHHHHHH}_{HHHHHHHHHHH}}^{AAAAAAAAAAA}$$

9. **Astronomical symbols**

Astronomical/logical symbols are in progress (coding, design, etc.). There is not enough room yet in the *mathb* series to provide a complete set of such symbols. If Mayan numerals are supressed, maybe...

> The Earth ⊕ (or ♁) is in rotation around the Sun ⊙ like Mercury ☿, Venus ♀, Mars ♂, Saturn ♄, Jupiter ♃, Uranus ♅, Neptune ♆ and Pluto ♇. But the Moon ☾ is not.

Also, there are Aries ♈, Taurus ♉, Gemini ♊, Leo ♌, Libra ♎, Scorpio ♏, etc. (Notice the use of `\lfilet` and `\rfilet` in the previous paragraph—which names may be changed.)

Of course, some symbols have an *alias* such as `\girl` and `\boy`:

$$\{(♂,♂),(♂,♀),(♀,♂),(♀,♀)\}.$$

These symbols are nice in some usual exercices of elementary Probability Theory.

10. **Unsupported**

As one can see further on, many things are unsupported. But this does not mean that few things extracted from unsupported stuff are not interesting. Below, one can see some shape that comes from my favorite pen and another I saw once on the web and thought it was astonishingly beautiful.

See mathcm10, mathum10, mathuxm10 in the next pages.

11. Mathabx font tables

Matha, major symbols series.

matham10	′0	′1	′2	′3	′4	′5	′6	′7	
′00x	+	−	×	÷	·	○	∗	∗	″0x
′01x	±	∓	⋉	⋊	◇	●	⋆	✶	
′02x	=	≡	∼	≈	≃	≅	≍	|	″1x
′03x	≠	≢	≁	≉	≄	≇	≭	∤	
′04x	¬	≪	≫	∦	⊢	⊣	⊬	⊮	″2x
′05x	⊨	⫤	⊭	⊯	⫦	⫣	⫧	⫥	
′06x	○	′	″	‴	⁗	♭	♮	♯	″3x
′07x	∞	∝	†	‡	Σ	Π	⨿	√	
′10x	∀	∁	∂	∄	∃	∄	∃	ↄ	″4x
′11x	∅	∅	⊤	⊥	⊁	⊀	≻	≺	
′12x	∈	∋	∉	∌	∉	∌	∈	∋	″5x
′13x	∩	∪	⊎	⊓	⊔	⊎	∧	∨	
′14x	⊕	⊖	⊗	⊘	⊙	◎	⊛	⊛	″6x
′15x	⊕	⊕	⊖	⊖	○	⊘	⊘	⊚	
′16x	(	)	[	]	{	}	⟦	⟧	″7x
′17x	⟨	⟩	\	/	|	‖	‖	|	
′20x	⊂	⊃	⊄	⊅	⊆	⊇	⊈	⊉	″8x
′21x	⊊	⊋	⊊	⊋	⫅	⫆	⫋	⫌	
′22x	⊊	⊋	⊊	⊋	⫅	⫆	⫋	⫌	″9x
′23x	◁	▷	⋪	⋫	⧏	⧐	⋬	⋭	
′24x	<	>	≮	≯	⩽	⩾	≰	≱	″Ax
′25x	≤	≥	≰	≱	≦	≧	≦	≧	
′26x	≰	≱	≦	≧	≰	≱	⩽	⩾	″Bx
′27x	≮	≯	⩽	⩾	≦	≧	≦	≧	
′30x	≲	≳	≴	≵	≲	≳	≲	≳	″Cx
′31x	≴	≵	≲	≳	≺	≻	⪡	⪢	
′32x	←	→	↑	↓	↖	↗	↙	↘	″Dx
′33x	↔	↕	↚	↛	↮	—	˙	˙	
′34x	←	→	←	→	↑	↓	↑	↓	″Ex
′35x	⇋	⇌	⇅	⇵	←	→	˃	˂	
′36x	⇐	⇒	⇑	⇓	⇔	⇕	⇍	⇏	″Fx
′37x	⇎	=	˙	˙	«	»	′	′	
	″8	″9	″A	″B	″C	″D	″E	″F	

Mathb, minor symbols series.

mathbm10	′0	′1	′2	′3	′4	′5	′6	′7	
′00x									″0x
′01x									
′02x									″1x
′03x									
′04x									″2x
′05x									
′06x									″3x
′07x									
′10x									″4x
′11x									
′12x									″5x
′13x									
′14x									″6x
′15x									
′16x									″7x
′17x									
′20x									″8x
′21x									
′22x									″9x
′23x									
′24x									″Ax
′25x									
′26x									″Bx
′27x									
′30x									″Cx
′31x									
′32x									″Dx
′33x									
′34x									″Ex
′35x									
′36x									″Fx
′37x									
	″8	″9	″A	″B	″C	″D	″E	″F	

Mathx, major extensible symbols series.

mathxm10	′0	′1	′2	′3	′4	′5	′6	′7	
′00x	(	(	(	(	⎛	⎝	⎜	⎜	″0x
′01x	)	)	)	)	⎞	⎠	⎜	‖	
′02x	[	[	[	[	⎡	⎣	⎢	⎢	″1x
′03x	]	]	]	]	⎤	⎦	⎥	⎥	
′04x	{	{	{	{	⎧	⎩	⎨	⎪	″2x
′05x	}	}	}	}	⎫	⎭	⎬	⎪	
′06x	⟦	⟦	⟦	⟦	⟧	⟧	‖	⧫	″3x
′07x	⟧	⟧	⟧	⟧	⟦	⟦	‖	⧫	
′10x	⟨	⟨	⟨	⟨	⟩	⟩	⟩	⟩	″4x
′11x	\	\	\	\	/	/	/	/	
′12x	⎡	⎡	⎡	⎡	⎤	⎤	⎥	⎥	″5x
′13x	⎣	⎣	⎣	⎣	⎦	⎦	⎥	⎥	
′14x	√	√	√	√	√	√	⎜	⌜	″6x
′15x	⌢	⌢	⌢	-	⌣	⌣	⌣	-	
′16x	^	ˇ	~	¯	→	⌢	⏜	⏝	″7x
′17x	⏜	⏜	⏜	⏜	⏝	⏝	⏝	⏝	
′20x	∼	∼	∼	∼	—	—	—	—	″8x
′21x	→	→	→	→	⏜	⏜	⏜	⏜	

′22x	+	×	⊂	∩	∪	⊎	⊓	⊔	″9x
′23x	⊞	⋀	⋁	⋏	⋎	↑	↓	∣	
′24x	+	×	⊂	∩	∪	⊎	⊓	⊔	″Ax
′25x	⊞	⋀	⋁	⋏	⋎	⇑	⇓	∥	
′26x	∑	∏	∐	∫	∬	∭	∮	∯	″Bx
′27x	∑	∏	∐	∫	∬	∭	∮	∯	
′30x	⊕	⊖	⊗	⊘	⊙	◎	⊛	⊛	″Cx
′31x	⊕	⊖	⊗	⊘	○	⊘	⊘	△	
′32x	⊞	⊟	⊠	⊡	⊡	⊡	⊠	⊠	″Dx
′33x	⊞	⊟	⊠	⊡	□	⊠	⊠	△	
′34x	⊕	⊖	⊗	⊘	⊙	◎	⊛	⊛	″Ex
′35x	⊕	⊖	⊗	⊘	○	⊘	⊘	△	
′36x	⊞	⊟	⊠	⊡	⊡	⊡	⊠	⊠	″Fx
′37x	⊞	⊟	⊠	⊡	□	⊠	⊠	△	
	″8	″9	″A	″B	″C	″D	″E	″F	

Mathc, unsupported calligraphic series. *The series mathc have some features that may interest people: it contains the whole set of calligraphic characters of* `cmsy` *and also extends it. The first part of this extension is the latin lowercase letters, and also the punctuation which make it a quite complete OT1 font. This part of the extension is due to me. Hebrew characters have been converted to MetaFont, adapted and extended (dagesh sign) also by me, but the source is some "professional" or commercial font.*

Things are in progress: ‹ punctuation ›, « ligatures », greek letters... Designs are deeply based on Computer Modern. Thus these series should be named cmchXX...

mathcm10/cmsy10

$\mathcal{AA}_{65}$ $\mathcal{BB}_{66}$ $\mathcal{CC}_{67}$ $\mathcal{DD}_{68}$ $\mathcal{EE}_{69}$ $\mathcal{FF}_{70}$ $\mathcal{GG}_{71}$ $\mathcal{HH}_{72}$ $\mathcal{II}_{73}$ $\mathcal{JJ}_{74}$ $\mathcal{KK}_{75}$ $\mathcal{LL}_{76}$ $\mathcal{MM}_{77}$ $\mathcal{NN}_{78}$
$\mathcal{OO}_{79}$ $\mathcal{PP}_{80}$ $\mathcal{QQ}_{81}$ $\mathcal{RR}_{82}$ $\mathcal{SS}_{83}$ $\mathcal{TT}_{84}$ $\mathcal{UU}_{85}$ $\mathcal{VV}_{86}$ $\mathcal{WW}_{87}$ $\mathcal{XX}_{88}$ $\mathcal{YY}_{89}$ $\mathcal{ZZ}_{90}$

cmsy10/cmmi10

$\mathcal{AA}_{65}$ $\mathcal{BB}_{66}$ $\mathcal{CC}_{67}$ $\mathcal{DD}_{68}$ $\mathcal{EE}_{69}$ $\mathcal{FF}_{70}$ $\mathcal{GG}_{71}$ $\mathcal{HH}_{72}$ $\mathcal{II}_{73}$ $\mathcal{JJ}_{74}$ $\mathcal{KK}_{75}$ $\mathcal{LL}_{76}$ $\mathcal{MM}_{77}$ $\mathcal{NN}_{78}$
$\mathcal{OO}_{79}$ $\mathcal{PP}_{80}$ $\mathcal{QQ}_{81}$ $\mathcal{RR}_{82}$ $\mathcal{SS}_{83}$ $\mathcal{TT}_{84}$ $\mathcal{UU}_{85}$ $\mathcal{VV}_{86}$ $\mathcal{WW}_{87}$ $\mathcal{XX}_{88}$ $\mathcal{YY}_{89}$ $\mathcal{ZZ}_{90}$

mathcm10/cmmi10

$\mathcal{AA}_{65}$ $\mathcal{BB}_{66}$ $\mathcal{CC}_{67}$ $\mathcal{DD}_{68}$ $\mathcal{EE}_{69}$ $\mathcal{FF}_{70}$ $\mathcal{GG}_{71}$ $\mathcal{HH}_{72}$ $\mathcal{II}_{73}$ $\mathcal{JJ}_{74}$ $\mathcal{KK}_{75}$ $\mathcal{LL}_{76}$ $\mathcal{MM}_{77}$ $\mathcal{NN}_{78}$
$\mathcal{OO}_{79}$ $\mathcal{PP}_{80}$ $\mathcal{QQ}_{81}$ $\mathcal{RR}_{82}$ $\mathcal{SS}_{83}$ $\mathcal{TT}_{84}$ $\mathcal{UU}_{85}$ $\mathcal{VV}_{86}$ $\mathcal{WW}_{87}$ $\mathcal{XX}_{88}$ $\mathcal{YY}_{89}$ $\mathcal{ZZ}_{90}$

mathcm10/cmmi10

$\mathcal{aa}_{97}$ $\mathcal{bb}_{98}$ $\mathcal{cc}_{99}$ $\mathcal{dd}_{100}$ $\mathcal{ee}_{101}$ $\mathcal{ff}_{102}$ $\mathcal{gg}_{103}$ $\mathcal{hh}_{104}$ $\mathcal{ii}_{105}$ $\mathcal{jj}_{106}$ $\mathcal{kk}_{107}$ $\mathcal{ll}_{108}$ $\mathcal{mm}_{109}$ $\mathcal{nn}_{110}$ $\mathcal{oo}_{111}$ $\mathcal{pp}_{112}$
$\mathcal{qq}_{113}$ $\mathcal{rr}_{114}$ $\mathcal{ss}_{115}$ $\mathcal{tt}_{116}$ $\mathcal{uu}_{117}$ $\mathcal{vv}_{118}$ $\mathcal{ww}_{119}$ $\mathcal{xx}_{120}$ $\mathcal{yy}_{121}$ $\mathcal{zz}_{122}$

mathcm10	´0	´1	´2	´3	´4	´5	´6	´7	
´00x	¿	¡	«	»					"0x
´01x	ct	fi	fl	ft	st				
´02x	ı	ȷ	`	´	ˇ	˘	¯	°	"1x
´03x	¸	ß	æ	œ	ø	Æ	Œ	Ø	
´04x		!	”	#			&	’	"2x
´05x	(	)	*	+	,	-	.	/	
´06x	0	1	2	3	4	5	6	7	"3x
´07x	8	9	:	;	‹	=	›	?	
´10x	@	A	B	C	D	E	F	G	"4x
´11x	H	I	J	K	L	M	N	O	
´12x	P	Q	R	S	T	U	V	W	"5x
´13x	X	Y	Z	[	“	]	^	˙	
´14x	‘	a	b	c	d	e	f	g	"6x
´15x	h	i	j	k	l	m	n	o	
´16x	p	q	r	s	t	u	v	w	"7x
´17x	x	y	z	–	—	˝	˜	¨	
´20x		A	B	F		E	Z	H	"8x
´21x	Θ	I	K	Λ	M	N		O	

′22x	Π	$\mathcal{P}$		$\mathcal{T}$			$\mathcal{X}$		″9x
′23x									
′24x		α	β	γ		ε		η	″Ax
′25x	ϑ	κ		μ	ν			o	
′26x	π	ρ			υ	ϕ	$\mathcal{X}$	ψ	″Bx
′27x			ϑ			ϱ		φ	
′30x	א	ב	ג	ד	ה	ו	ז	ח	″Cx
′31x	ט	י	ך	כ	ל	ם	מ	ן	
′32x	נ	ס	ע	ף	פ	ץ	צ	ק	″Dx
′33x	ר	ש	ת						
′34x	𐤀	𐤁	𐤂	𐤃	𐤄	𐤅	𐤆	𐤇	″Ex
′35x	𐤈	𐤉	𐤊	𐤋	𐤌	𐤍	𐤎	𐤏	
′36x	𐤐	𐤑	𐤒	𐤓	𐤔	𐤕	𐤖	𐤗	″Fx
′37x	𐤘	𐤙	𐤚						
	″8	″9	″A	″B	″C	″D	″E	″F	

On November 14, 1885, Senator & Mrs. Leland Stanford called together at their San Francisco mansion the 24 prominent men who had been chosen as the first trustees of The Leland Stanford Junior University. They handed to the board the Founding Grant of the University, which they had executed three days before. This document—with various amendments, legislative acts, and court decrees—remains as the University's charter. In bold, sweeping language it stipulates that the objectives of the University are "to qualify students for personal success and direct usefulness in life; and to promote the publick welfare by exercising an influence in behalf of humanity and civilization, teaching the blessings of liberty regulated by law, and inculcating love and reverence for the great principles of government as derived from the inalienable rights of man to life, liberty, and the pursuit of happiness." ¿But aren't Kafka's Schloß and Æsop's Œuvres often naïve vis-à-vis the dæmonic phœnix's official rôle in fluffy soufflés? (¡THE DAZED BROWN FOX QUICKLY GAVE 12345–67890 JUMPS!)
Ångelå Beatrice Claire Diana Érica Françoise Ginette Hélène Iris Jackie Kāren Laura María Nătalĭe Øctave Pauline Quêneau Roxanne Sabine Tăja Uršula Vivian Wendy Xanthippe Yvønne Zäzilie

Random test of gray.

qhvjjgdmferkfrhkasweeldrermfyfskaubxpelpplk
atmfqmfleyrryldlmuzhputskkyadgxmunmguymbuas
cqoiyjchvsgfepgvaxrohriqykwwgoijbemknoejaxy
aiarkoncpzskldqeyglgrypxygpyfezlhjooazibevu
swrizghyhdbzutojfkalbngnklkfopoaxhfnggxysjo
hojzekyyywqiemchclxhlimwzxpnkzdbyufzagmrgma
pvtkzslyoxlqjxwuxzonudxbribycwrbtzokekxdltc
ryltlzeokijwxojpwkqegerftovhsbeiwhkxkmqpzic
dcqlfyrszexssytjdoaplcxgbwagbrcrzjemnidtbep
zplezispxbjeypcpzvlkfivbfoysqlbdkadweuqvelc

cwfnvlgzkcfmiwprmsbrmuzytqgquzcjhuuirfdskwq
yqyydjvhlcuextsufvqeeoahdskznbernwsgizutfae
zchjmxofotauvruwcusvjmbfvrkbtvbklhjjvhqgnxe
qouzkjdemaizngcsuuqbqgcqnsohzbnctpqqfjdlyiw
iurzuwgbhvbefhdphecfrzzzegtzxerhgtzwoqpjkdw
awifcyzwvyseojabbzwfprrvembduhulywbifjfhgkn
muqwelxfftremyfuogdzezgtysbglozucihazxkxiql
cnvycxdgrcheggnqgjuxhoezubijbgrsuurohxxsfoq
vouvsmdisehlhynwquvburdaxpkviztqbeutgzpzbsd
wdofajugiwefavvxcihzmdgyovnwstllshnxbcxcihm
gvigwbnnjwhzrlcjboljmrimylychfgovwydmvacoaf
fzblmtcdbubnkdyxjnhratvsfsiovijnfjtfldgjnui
txjycgnrtdcuqseindotxxkbuhdlozwkrxfusrozwmx
dywvuqlqwoqmlivjrbeyktwtirefxdaqvmgkhodsnui
pnnnkvlfvsxqknmjurvtxfjissrclycxuyhwwlevmbp

μοβκηκγρνχβχπρβχψμονμφφρνβον
ηρυρφχεηθρνφρρεπνγμχθμεχγ
ακφγπμκρνκββμκκυπψθψοφρ
ρκαφφγμηυυηραεθθφνγφεχρφβ
βποκχθθυθρφγμψνθθφφθθη
θπφηχυψγνθθκψθθρροφθμθαε
ρθκεομανυφβεβαοχγρθρυηθγθθθβ
θρρβμφγφφμρροψμβμεορευψμρ
υβαβρκφγθκυκγβκθγχφυρβο
θυπγθορφγνβφνφφθεμφβψ
βθμφυγυφβρθυημηοκερφνχυο
βηουφθβθοφθερρθχενμνθψθ
θκχφχθρνμγοθθθθθεκυβθαβθχβ
φερρρθφενβνκψυθκηηραφυφφυφυφκχ
ψαυθρηκρφπχθφνμμυχθυθφν
φκμφγθνερμψρμαφφψφγβνπβομθφαθα
φκβφυγροναθπμκφθμμεθβνκ
υγπθπθκαυυαπκεψθηθφφπομ
εφθαγμπθφθφαρπγχυρχμθκβφ
νραγραρμκρβθθρπγγκχοκοαυ
υηυυφρεβγρψθψχπθηκενοψψ
κοκθρφθεπψκρθυθχβχθφγμ
κνχμμρβρφχμβρθπκγρφθνο
ηγχεβχρβαθβγνρεψουυνπρψθθγα
νκγηαμθθνοφθεθαβνβηγναθθψναχυ

00010203040506070809 0
10111213141516171819 1
20212223242526272829 2
30313233343536373839 3
40414243444546474849 4
50515253545556575859 5
60616263646566676869 6

707172737475767778797
808182838485868788898
909192939495969798999

Test of accents.
$\mathcal{A}\ \check{\mathcal{A}}\ \bar{\mathcal{A}}\ \dot{\mathcal{A}}\ \dot{\mathcal{A}}\ \ddot{\mathcal{A}}\ \grave{\mathcal{A}}\ \acute{\mathcal{A}}\ \hat{\mathcal{A}}\ \check{\mathcal{A}}\ \tilde{\mathcal{A}}\ \acute{\mathcal{A}}$
$\mathcal{B}\ \check{\mathcal{B}}\ \bar{\mathcal{B}}\ \dot{\mathcal{B}}\ \dot{\mathcal{B}}\ \ddot{\mathcal{B}}\ \grave{\mathcal{B}}\ \acute{\mathcal{B}}\ \hat{\mathcal{B}}\ \check{\mathcal{B}}\ \tilde{\mathcal{B}}\ \acute{\mathcal{B}}$
$\mathcal{C}\ \check{\mathcal{C}}\ \bar{\mathcal{C}}\ \dot{\mathcal{C}}\ \dot{\mathcal{C}}\ \ddot{\mathcal{C}}\ \grave{\mathcal{C}}\ \acute{\mathcal{C}}\ \hat{\mathcal{C}}\ \check{\mathcal{C}}\ \tilde{\mathcal{C}}\ \acute{\mathcal{C}}$
$\mathcal{D}\ \check{\mathcal{D}}\ \bar{\mathcal{D}}\ \dot{\mathcal{D}}\ \dot{\mathcal{D}}\ \ddot{\mathcal{D}}\ \grave{\mathcal{D}}\ \acute{\mathcal{D}}\ \hat{\mathcal{D}}\ \check{\mathcal{D}}\ \tilde{\mathcal{D}}\ \acute{\mathcal{D}}$
$\mathcal{E}\ \check{\mathcal{E}}\ \bar{\mathcal{E}}\ \dot{\mathcal{E}}\ \dot{\mathcal{E}}\ \ddot{\mathcal{E}}\ \grave{\mathcal{E}}\ \acute{\mathcal{E}}\ \hat{\mathcal{E}}\ \check{\mathcal{E}}\ \tilde{\mathcal{E}}\ \acute{\mathcal{E}}$
$\mathcal{F}\ \check{\mathcal{F}}\ \bar{\mathcal{F}}\ \dot{\mathcal{F}}\ \dot{\mathcal{F}}\ \ddot{\mathcal{F}}\ \grave{\mathcal{F}}\ \acute{\mathcal{F}}\ \hat{\mathcal{F}}\ \check{\mathcal{F}}\ \tilde{\mathcal{F}}\ \acute{\mathcal{F}}$
$\mathcal{G}\ \check{\mathcal{G}}\ \bar{\mathcal{G}}\ \dot{\mathcal{G}}\ \dot{\mathcal{G}}\ \ddot{\mathcal{G}}\ \grave{\mathcal{G}}\ \acute{\mathcal{G}}\ \hat{\mathcal{G}}\ \check{\mathcal{G}}\ \tilde{\mathcal{G}}\ \acute{\mathcal{G}}$
$\mathcal{H}\ \check{\mathcal{H}}\ \bar{\mathcal{H}}\ \dot{\mathcal{H}}\ \dot{\mathcal{H}}\ \ddot{\mathcal{H}}\ \grave{\mathcal{H}}\ \acute{\mathcal{H}}\ \hat{\mathcal{H}}\ \check{\mathcal{H}}\ \tilde{\mathcal{H}}\ \acute{\mathcal{H}}$
$\mathcal{I}\ \check{\mathcal{I}}\ \bar{\mathcal{I}}\ \dot{\mathcal{I}}\ \dot{\mathcal{I}}\ \ddot{\mathcal{I}}\ \grave{\mathcal{I}}\ \acute{\mathcal{I}}\ \hat{\mathcal{I}}\ \check{\mathcal{I}}\ \tilde{\mathcal{I}}\ \acute{\mathcal{I}}$
$\mathcal{J}\ \check{\mathcal{J}}\ \bar{\mathcal{J}}\ \dot{\mathcal{J}}\ \dot{\mathcal{J}}\ \ddot{\mathcal{J}}\ \grave{\mathcal{J}}\ \acute{\mathcal{J}}\ \hat{\mathcal{J}}\ \check{\mathcal{J}}\ \tilde{\mathcal{J}}\ \acute{\mathcal{J}}$
$\mathcal{K}\ \check{\mathcal{K}}\ \bar{\mathcal{K}}\ \dot{\mathcal{K}}\ \dot{\mathcal{K}}\ \ddot{\mathcal{K}}\ \grave{\mathcal{K}}\ \acute{\mathcal{K}}\ \hat{\mathcal{K}}\ \check{\mathcal{K}}\ \tilde{\mathcal{K}}\ \acute{\mathcal{K}}$
$\mathcal{L}\ \check{\mathcal{L}}\ \bar{\mathcal{L}}\ \dot{\mathcal{L}}\ \dot{\mathcal{L}}\ \ddot{\mathcal{L}}\ \grave{\mathcal{L}}\ \acute{\mathcal{L}}\ \hat{\mathcal{L}}\ \check{\mathcal{L}}\ \tilde{\mathcal{L}}\ \acute{\mathcal{L}}$
$\mathcal{M}\ \check{\mathcal{M}}\ \bar{\mathcal{M}}\ \dot{\mathcal{M}}\ \dot{\mathcal{M}}\ \ddot{\mathcal{M}}\ \grave{\mathcal{M}}\ \acute{\mathcal{M}}\ \hat{\mathcal{M}}\ \check{\mathcal{M}}\ \tilde{\mathcal{M}}\ \acute{\mathcal{M}}$
$\mathcal{N}\ \check{\mathcal{N}}\ \bar{\mathcal{N}}\ \dot{\mathcal{N}}\ \dot{\mathcal{N}}\ \ddot{\mathcal{N}}\ \grave{\mathcal{N}}\ \acute{\mathcal{N}}\ \hat{\mathcal{N}}\ \check{\mathcal{N}}\ \tilde{\mathcal{N}}\ \acute{\mathcal{N}}$
$\mathcal{O}\ \check{\mathcal{O}}\ \bar{\mathcal{O}}\ \dot{\mathcal{O}}\ \dot{\mathcal{O}}\ \ddot{\mathcal{O}}\ \grave{\mathcal{O}}\ \acute{\mathcal{O}}\ \hat{\mathcal{O}}\ \check{\mathcal{O}}\ \tilde{\mathcal{O}}\ \acute{\mathcal{O}}$
$\mathcal{P}\ \check{\mathcal{P}}\ \bar{\mathcal{P}}\ \dot{\mathcal{P}}\ \dot{\mathcal{P}}\ \ddot{\mathcal{P}}\ \grave{\mathcal{P}}\ \acute{\mathcal{P}}\ \hat{\mathcal{P}}\ \check{\mathcal{P}}\ \tilde{\mathcal{P}}\ \acute{\mathcal{P}}$
$\mathcal{Q}\ \check{\mathcal{Q}}\ \bar{\mathcal{Q}}\ \dot{\mathcal{Q}}\ \dot{\mathcal{Q}}\ \ddot{\mathcal{Q}}\ \grave{\mathcal{Q}}\ \acute{\mathcal{Q}}\ \hat{\mathcal{Q}}\ \check{\mathcal{Q}}\ \tilde{\mathcal{Q}}\ \acute{\mathcal{Q}}$
$\mathcal{R}\ \check{\mathcal{R}}\ \bar{\mathcal{R}}\ \dot{\mathcal{R}}\ \dot{\mathcal{R}}\ \ddot{\mathcal{R}}\ \grave{\mathcal{R}}\ \acute{\mathcal{R}}\ \hat{\mathcal{R}}\ \check{\mathcal{R}}\ \tilde{\mathcal{R}}\ \acute{\mathcal{R}}$
$\mathcal{S}\ \check{\mathcal{S}}\ \bar{\mathcal{S}}\ \dot{\mathcal{S}}\ \dot{\mathcal{S}}\ \ddot{\mathcal{S}}\ \grave{\mathcal{S}}\ \acute{\mathcal{S}}\ \hat{\mathcal{S}}\ \check{\mathcal{S}}\ \tilde{\mathcal{S}}\ \acute{\mathcal{S}}$
$\mathcal{T}\ \check{\mathcal{T}}\ \bar{\mathcal{T}}\ \dot{\mathcal{T}}\ \dot{\mathcal{T}}\ \ddot{\mathcal{T}}\ \grave{\mathcal{T}}\ \acute{\mathcal{T}}\ \hat{\mathcal{T}}\ \check{\mathcal{T}}\ \tilde{\mathcal{T}}\ \acute{\mathcal{T}}$
$\mathcal{U}\ \check{\mathcal{U}}\ \bar{\mathcal{U}}\ \dot{\mathcal{U}}\ \dot{\mathcal{U}}\ \ddot{\mathcal{U}}\ \grave{\mathcal{U}}\ \acute{\mathcal{U}}\ \hat{\mathcal{U}}\ \check{\mathcal{U}}\ \tilde{\mathcal{U}}\ \acute{\mathcal{U}}$
$\mathcal{V}\ \check{\mathcal{V}}\ \bar{\mathcal{V}}\ \dot{\mathcal{V}}\ \dot{\mathcal{V}}\ \ddot{\mathcal{V}}\ \grave{\mathcal{V}}\ \acute{\mathcal{V}}\ \hat{\mathcal{V}}\ \check{\mathcal{V}}\ \tilde{\mathcal{V}}\ \acute{\mathcal{V}}$
$\mathcal{W}\ \check{\mathcal{W}}\ \bar{\mathcal{W}}\ \dot{\mathcal{W}}\ \dot{\mathcal{W}}\ \ddot{\mathcal{W}}\ \grave{\mathcal{W}}\ \acute{\mathcal{W}}\ \hat{\mathcal{W}}\ \check{\mathcal{W}}\ \tilde{\mathcal{W}}\ \acute{\mathcal{W}}$
$\mathcal{X}\ \check{\mathcal{X}}\ \bar{\mathcal{X}}\ \dot{\mathcal{X}}\ \dot{\mathcal{X}}\ \ddot{\mathcal{X}}\ \grave{\mathcal{X}}\ \acute{\mathcal{X}}\ \hat{\mathcal{X}}\ \check{\mathcal{X}}\ \tilde{\mathcal{X}}\ \acute{\mathcal{X}}$
$\mathcal{Y}\ \check{\mathcal{Y}}\ \bar{\mathcal{Y}}\ \dot{\mathcal{Y}}\ \dot{\mathcal{Y}}\ \ddot{\mathcal{Y}}\ \grave{\mathcal{Y}}\ \acute{\mathcal{Y}}\ \hat{\mathcal{Y}}\ \check{\mathcal{Y}}\ \tilde{\mathcal{Y}}\ \acute{\mathcal{Y}}$
$\mathcal{Z}\ \check{\mathcal{Z}}\ \bar{\mathcal{Z}}\ \dot{\mathcal{Z}}\ \dot{\mathcal{Z}}\ \ddot{\mathcal{Z}}\ \grave{\mathcal{Z}}\ \acute{\mathcal{Z}}\ \hat{\mathcal{Z}}\ \check{\mathcal{Z}}\ \tilde{\mathcal{Z}}\ \acute{\mathcal{Z}}$
$a\ \check{a}\ \bar{a}\ \dot{a}\ \dot{a}\ \ddot{a}\ \grave{a}\ \acute{a}\ \hat{a}\ \check{a}\ \tilde{a}\ \acute{a}$
$b\ \check{b}\ \bar{b}\ \dot{b}\ \dot{b}\ \ddot{b}\ \grave{b}\ \acute{b}\ \hat{b}\ \check{b}\ \tilde{b}\ \acute{b}$
$c\ \check{c}\ \bar{c}\ \dot{c}\ \dot{c}\ \ddot{c}\ \grave{c}\ \acute{c}\ \hat{c}\ \check{c}\ \tilde{c}\ \acute{c}$
$d\ \check{d}\ \bar{d}\ \dot{d}\ \dot{d}\ \ddot{d}\ \grave{d}\ \acute{d}\ \hat{d}\ \check{d}\ \tilde{d}\ \acute{d}$
$e\ \check{e}\ \bar{e}\ \dot{e}\ \dot{e}\ \ddot{e}\ \grave{e}\ \acute{e}\ \hat{e}\ \check{e}\ \tilde{e}\ \acute{e}$
$f\ \check{f}\ \bar{f}\ \dot{f}\ \dot{f}\ \ddot{f}\ \grave{f}\ \acute{f}\ \hat{f}\ \check{f}\ \tilde{f}\ \acute{f}$
$g\ \check{g}\ \bar{g}\ \dot{g}\ \dot{g}\ \ddot{g}\ \grave{g}\ \acute{g}\ \hat{g}\ \check{g}\ \tilde{g}\ \acute{g}$
$h\ \check{h}\ \bar{h}\ \dot{h}\ \dot{h}\ \ddot{h}\ \grave{h}\ \acute{h}\ \hat{h}\ \check{h}\ \tilde{h}\ \acute{h}$
$i\ \check{i}\ \bar{i}\ \dot{i}\ \dot{i}\ \ddot{i}\ \grave{i}\ \acute{i}\ \hat{i}\ \check{i}\ \tilde{i}\ \acute{i}$
$j\ \check{j}\ \bar{j}\ \dot{j}\ \dot{j}\ \ddot{j}\ \grave{j}\ \acute{j}\ \hat{j}\ \check{j}\ \tilde{j}\ \acute{j}$
$k\ \check{k}\ \bar{k}\ \dot{k}\ \dot{k}\ \ddot{k}\ \grave{k}\ \acute{k}\ \hat{k}\ \check{k}\ \tilde{k}\ \acute{k}$
$l\ \check{l}\ \bar{l}\ \dot{l}\ \dot{l}\ \ddot{l}\ \grave{l}\ \acute{l}\ \hat{l}\ \check{l}\ \tilde{l}\ \acute{l}$
$m\ \check{m}\ \bar{m}\ \dot{m}\ \dot{m}\ \ddot{m}\ \grave{m}\ \acute{m}\ \hat{m}\ \check{m}\ \tilde{m}\ \acute{m}$
$n\ \check{n}\ \bar{n}\ \dot{n}\ \dot{n}\ \ddot{n}\ \grave{n}\ \acute{n}\ \hat{n}\ \check{n}\ \tilde{n}\ \acute{n}$
$o\ \check{o}\ \bar{o}\ \dot{o}\ \dot{o}\ \ddot{o}\ \grave{o}\ \acute{o}\ \hat{o}\ \check{o}\ \tilde{o}\ \acute{o}$
$p\ \check{p}\ \bar{p}\ \dot{p}\ \dot{p}\ \ddot{p}\ \grave{p}\ \acute{p}\ \hat{p}\ \check{p}\ \tilde{p}\ \acute{p}$

g̱ ǧ q̱ ǧ ġ q̈ ġ ǵ ĝ ǧ q̃ q̋
ɣ ř r̄ ṛ ṙ r̈ ṛ ŕ r̂ ř r̃ r̋
g̱ š s̄ ṣ ṡ s̈ ṣ ś ŝ š s̃ s̋
ţ ť t̄ ṭ ṫ ẗ ṭ ť t̂ ť t̃ t̋
u̱ ŭ ū u̱ u̇ ü ù ú û ŭ ũ ű
ɣ v̆ v̄ v̱ v̇ v̈ v̀ v́ v̂ v̆ ṽ v̋
w̱ w̆ w̄ w̱ ẇ ẅ ẁ ẃ ŵ w̆ w̃ w̋
x̱ x̆ x̄ x̱ ẋ ẍ x̀ x́ x̂ x̆ x̃ x̋
y̱ y̆ ȳ y̱ ẏ ÿ ỳ ý ŷ y̆ ỹ ÿ
ẕ ž z̄ ẕ ż z̈ z̀ ź ẑ ž z̃ z̋
ɻ ǐ ī ɻ i̇ ï ì í î ǐ ĩ ı̋
ȷ ǰ ȷ̄ ȷ̱ j̇ j̈ ȷ̀ ȷ́ ĵ ǰ ȷ̃ ȷ̋

Mathu, unsupported symbols series.

mathum10	′0	′1	′2	′3	′4	′5	′6	′7	
′00x	□	⬠	⬡	○	◇	⬠	⬡	○	″0x
′01x	☆	★	✡	✸		⊱	⊰	⊱⊰	
′02x	△	▽	◁	▷	▲	▼	◀	▶	″1x
′03x	△	▽	◁	▷	▲	▼	◀	▶	
′04x	⟲	⟳	⟲	Q	⊙	⊍	⊡	⊡	″2x
′05x	⊍	⊂	∩	∪	⌣	⌢	\	⌐	
′06x	⋇	≋	≋	≃	≠	≀	∽	≂	″3x
′07x	*	*	**	⊇	✠	✠	✠	⊗	
′10x	♡	♢	♠	♣	✪	✪	⊡	⊡	″4x
′11x	⚁	⚂	⚃	⚄	⚅	⚅	⚅	⚅	
′12x	⚅	⚅	□	⊡	⁘	⁘	⁘	⁘	″5x
′13x	⁞	⊐	⊐	⊐	⊐	⁘	⁘	⁞	
′14x	⊏	⊡	⊡	⁘	⁘	⁘	⁞	⊔	″6x
′15x	⊔	⊔	⊔	⁘	⁘	⁞	⊞	⩔	
′26x	↟	↡	↕	⇞	⇟	⇳	⇐	⇒	″Bx
′27x	⇳								
′30x	⊕	⊕	⊙	⊛	⊛	⊜	⊲	⊳	″Cx
′31x	⊜	⊜	⊖	⊕	⊕	⊗	⊴	⊵	
′32x	⊘	⊘	◐	◑	◓	◒	◴	◵	″Dx
′33x	◶	◵	☯	☢	☮	⊖			
′34x	⊞	⊞	⊡	⊠	⊠	⊽	⊲	⊳	″Ex
′35x	⊟	⊟	⊟	⊞	⊞	⊠	⊠	⊠	
′36x	◬	◭	◧	◨	◓	◒	◩	◪	″Fx
′37x	◣	◢	☯	☢	☮	⊟			
	″8	″9	″A	″B	″C	″D	″E	″F	

Mathux, unsupported extensible symbols series.

mathuxm10	′0	′1	′2	′3	′4	′5	′6	′7	
′00x									″0x
′01x									
′02x									″1x
′03x									
′04x									″2x
′05x									
′06x									″3x
′07x									
′10x									″4x
′11x									
′20x									″8x
′21x									
′22x									″9x
′23x									
′24x									″Ax
′25x									
′26x									″Bx
′27x									
′30x									″Cx
′31x									
′32x									″Dx
′33x									
′34x									″Ex
′35x									
′36x									″Fx
′37x									
	″8	″9	″A	″B	″C	″D	″E	″F	

Mathastrotest10, about the metaness of astronomical/logical symbols. Who cares about astronomical/logical symbols? So why trying to do something great with them? General shapes are even unstable: they are never the same from a reference to another. I think that I've been convinced by the presence of some such symbols in the fonts tables of the famous book "The Printing of Mathematics". By the way it remembers me that if I want to extend this subset of *mathb*, I would have

to take into account that I have already put some metaness in these designs.

⊙⊙⊙⊙⊙⊙⊙⊙ ☿☿☿☿☿☿☿☿ ♀♀♀♀♀♀♀♀ ⊕⊕⊕⊕⊕⊕⊕⊕ ♂♂♂♂♂♂♂♂ ♃♃♃♃♃♃♃♃
♄♄♄♄♄♄♄♄ ♁♁♁♁♁♁♁♁ ♆♆♆♆♆♆♆♆ ♇♇♇♇♇♇♇♇ ♁♁♁♁♁♁♁♁ ☾☾☾☾☾☾☾☾
☽☽☽☽☽☽☽☽ ○○○○○○○○ ●●●●●●●● ♈♈♈♈♈♈♈♈ ♉♉♉♉♉♉♉♉
♊♊♊♊♊♊♊♊ ♌♌♌♌♌♌♌♌ ♎♎♎♎♎♎♎♎
♏♏♏♏♏♏♏♏ ♐♐♐♐♐♐♐♐ ♓♓♓♓♓♓♓♓ ♑♑♑♑♑♑♑♑
♑♑♑♑♑♑♑♑ ♌♌♌♌♌♌♌♌ ♉♉♉♉♉♉♉♉

mathastrotest	10 ′0	′1	′2	′3	′4	′5	′6	′7	
′00x	⊙	☿	♀	⊕	♂	♃	♄	♁	"0x
′01x	♆	♇	♁	☾	☽	○	●	♈	
′02x	♉	♊		♌		♎	♏	♐	"1x
′03x		♒	♓	♑	♑	♌	♉		
′04x	⊙	☿	♀	⊕	♂	♃	♄	♁	"2x
′05x	♆	♇	♁	☾	☽	○	●	♈	
′06x	♉	♊		♌		♎	♏	♐	"3x
′07x		♒	♓	♑	♑	♌	♉		
′10x	⊙	☿	♀	⊕	♂	♃	♄	♁	"4x
′11x	♆	♇	♁	☾	☽	○	●	♈	
′12x	♉	♊		♌		♎	♏	♐	"5x
′13x		♒	♓	♑	♑	♌	♉		
′14x	⊙	☿	♀	⊕	♂	♃	♄	♁	"6x
′15x	♆	♇	♁	☾	☽	○	●	♈	
′16x	♉	♊		♌		♎	♏	♐	"7x
′17x		♒	♓	♑	♑	♌	♉		
′20x	⊙	☿	♀	⊕	♂	♃	♄	♁	"8x
′21x	♆	♇	♁	☾	☽	○	●	♈	
′22x	♉	♊		♌		♎	♏	♐	"9x
′23x		♒	♓	♑	♑	♌	♉		
′24x	⊙	☿	♀	⊕	♂	♃	♄	♁	"Ax
′25x	♆	♇	♁	☾	☽	○	●	♈	
′26x	♉	♊		♌		♎	♏	♐	"Bx
′27x		♒	♓	♑	♑	♌	♉		
′30x	⊙	☿	♀	⊕	♂	♃	♄	♁	"Cx
′31x	♆	♇	♁	☾	☽	○	●	♈	
′32x	♉	♊		♌		♎	♏	♐	"Dx
′33x		♒	♓	♑	♑	♌	♉		
′34x	⊙	☿	♀	⊕	♂	♃	♄	♁	"Ex
′35x	♆	♇	♁	☾	☽	○	●	♈	

′36x	♉	♊		♌		♍	♎	♐	″Fx
′37x		♒	♓	♌	♌	♍	♑		
	″8	″9	″A	″B	″C	″D	″E	″F	