

The `amssymb` package

American Mathematical Society

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1 Introduction

This file defines all the symbols found in the AMS symbol fonts `msam` and `msbm`.

2 The Implementation

First provide package identification.

```
\NeedsTeXFormat{LaTeX2e}% LaTeX 2.09 can't be used (nor non-LaTeX)
[1994/12/01]% LaTeX date must be December 1994 or later
\ProvidesPackage{amssymb}[2009/06/22 v3.00]
```

See the `amsfonts` package documentation for a discussion of the obsolescence of the `psamfonts` option.

```
\DeclareOption{psamfonts}{\PassOptionsToPackage{psamfonts}{amsfonts}}
```

Process options.

```
\ProcessOptions\relax
```

We call the `amsfonts` package to do the font setup that we need.

```
\RequirePackage{amsfonts}[1995/01/01]
```

We undefine a few symbols that were perhaps defined by the `amsfonts` package (q.v.); otherwise `\DeclareMathSymbol` would issue some error messages. (All these symbol names are `\let` to the first defined; that way, if the underlying code changes, only one change needs to be made here.)

```
\let\square\relax \let\rightrightarrows\square \let\lozenge\square
\let\vartriangleright\square \let\vartriangleleft\square
\let\trianglerighteq\square \let\trianglelefteq\square
```

Change the `\catcode` of the double-quote character to ensure that it is not active (which at one time was a problem when something like `german.sty` was used). This means that `\let` statements must be made global.

```
\begingroup \catcode'\="=12
```

Now we define the complete set of standard symbol names for the `msam` and `msbm` fonts. Redefinitions of symbols or commands which can't be defined via `\DeclareMathSymbol` are already done in the `amsfonts` package (for example, `\yen`, `\widehat`).

```
\DeclareMathSymbol{\boxdot}      {\mathbin}{AMSA}{"00}
\DeclareMathSymbol{\boxplus}     {\mathbin}{AMSA}{"01}
```

```

\DeclareMathSymbol{\boxtimes}      {\mathbin}{AMSA}{"02}
\DeclareMathSymbol{\square}        {\mathord}{AMSA}{"03}
\DeclareMathSymbol{\blacksquare}    {\mathord}{AMSA}{"04}
\DeclareMathSymbol{\centerdot}      {\mathbin}{AMSA}{"05}
\DeclareMathSymbol{\lozenge}        {\mathord}{AMSA}{"06}
\DeclareMathSymbol{\blacklozenge}   {\mathord}{AMSA}{"07}
\DeclareMathSymbol{\circlearrowright} {\mathrel}{AMSA}{"08}
\DeclareMathSymbol{\circlearrowleft} {\mathrel}{AMSA}{"09}
%% In amsfonts.sty:
%%\DeclareMathSymbol{\rightleftharpoons}{\mathrel}{AMSA}{"0A}
\DeclareMathSymbol{\leftrightharpoons} {\mathrel}{AMSA}{"0B}
\DeclareMathSymbol{\boxminus}        {\mathbin}{AMSA}{"0C}
\DeclareMathSymbol{\Vdash}           {\mathrel}{AMSA}{"0D}
\DeclareMathSymbol{\Vvdash}          {\mathrel}{AMSA}{"0E}
\DeclareMathSymbol{\vDash}           {\mathrel}{AMSA}{"0F}
\DeclareMathSymbol{\twoheadrightarrow} {\mathrel}{AMSA}{"10}
\DeclareMathSymbol{\twoheadleftarrow} {\mathrel}{AMSA}{"11}
\DeclareMathSymbol{\leftleftarrows}  {\mathrel}{AMSA}{"12}
\DeclareMathSymbol{\rightrightarrows} {\mathrel}{AMSA}{"13}
\DeclareMathSymbol{\upuparrows}      {\mathrel}{AMSA}{"14}
\DeclareMathSymbol{\downdownarrows}  {\mathrel}{AMSA}{"15}
\DeclareMathSymbol{\upharpoonright}  {\mathrel}{AMSA}{"16}
\global\let\restriction\upharpoonright
\DeclareMathSymbol{\downharpoonright} {\mathrel}{AMSA}{"17}
\DeclareMathSymbol{\upharpoonleft}   {\mathrel}{AMSA}{"18}
\DeclareMathSymbol{\downharpoonleft} {\mathrel}{AMSA}{"19}
\DeclareMathSymbol{\rightarrowtail}  {\mathrel}{AMSA}{"1A}
\DeclareMathSymbol{\leftarrowtail}   {\mathrel}{AMSA}{"1B}
\DeclareMathSymbol{\leftrightarrows} {\mathrel}{AMSA}{"1C}
\DeclareMathSymbol{\rightleftarrows} {\mathrel}{AMSA}{"1D}
\DeclareMathSymbol{\Lsh}              {\mathrel}{AMSA}{"1E}
\DeclareMathSymbol{\Rsh}              {\mathrel}{AMSA}{"1F}
\DeclareMathSymbol{\rightsquigarrow}  {\mathrel}{AMSA}{"20}
\DeclareMathSymbol{\leftrightsquigarrow} {\mathrel}{AMSA}{"21}
\DeclareMathSymbol{\looparrowleft}   {\mathrel}{AMSA}{"22}
\DeclareMathSymbol{\looparrowright}  {\mathrel}{AMSA}{"23}
\DeclareMathSymbol{\circeq}          {\mathrel}{AMSA}{"24}
\DeclareMathSymbol{\succsim}         {\mathrel}{AMSA}{"25}
\DeclareMathSymbol{\gtrsim}          {\mathrel}{AMSA}{"26}
\DeclareMathSymbol{\gtrapprox}        {\mathrel}{AMSA}{"27}
\DeclareMathSymbol{\multimap}        {\mathrel}{AMSA}{"28}
\DeclareMathSymbol{\therefore}       {\mathrel}{AMSA}{"29}
\DeclareMathSymbol{\because}         {\mathrel}{AMSA}{"2A}
\DeclareMathSymbol{\doteqdot}        {\mathrel}{AMSA}{"2B}
\global\let\Doteq\doteqdot
\DeclareMathSymbol{\triangleq}       {\mathrel}{AMSA}{"2C}
\DeclareMathSymbol{\precsim}         {\mathrel}{AMSA}{"2D}
\DeclareMathSymbol{\lessim}          {\mathrel}{AMSA}{"2E}
\DeclareMathSymbol{\lessapprox}      {\mathrel}{AMSA}{"2F}
\DeclareMathSymbol{\eqslantless}     {\mathrel}{AMSA}{"30}

```

```

\DeclareMathSymbol{\eqslantgtr}    {\mathrel}{AMSA}{"31}
\DeclareMathSymbol{\curlyeqprec}   {\mathrel}{AMSA}{"32}
\DeclareMathSymbol{\curlyeqsucc}   {\mathrel}{AMSA}{"33}
\DeclareMathSymbol{\preccurlyeq}   {\mathrel}{AMSA}{"34}
\DeclareMathSymbol{\leqq}          {\mathrel}{AMSA}{"35}
\DeclareMathSymbol{\leqslant}      {\mathrel}{AMSA}{"36}
\DeclareMathSymbol{\lessgtr}       {\mathrel}{AMSA}{"37}
\DeclareMathSymbol{\backprime}     {\mathord}{AMSA}{"38}
\DeclareMathSymbol{\risingdotseq}  {\mathrel}{AMSA}{"3A}
\DeclareMathSymbol{\fallingdotseq}{\mathrel}{AMSA}{"3B}
\DeclareMathSymbol{\succcurlyeq}   {\mathrel}{AMSA}{"3C}
\DeclareMathSymbol{\geqq}          {\mathrel}{AMSA}{"3D}
\DeclareMathSymbol{\geqslant}      {\mathrel}{AMSA}{"3E}
\DeclareMathSymbol{\gtrless}       {\mathrel}{AMSA}{"3F}
%% in amsfonts.sty
%% \DeclareMathSymbol{\sqsubset}    {\mathrel}{AMSA}{"40}
%% \DeclareMathSymbol{\sqsupset}    {\mathrel}{AMSA}{"41}
\DeclareMathSymbol{\vartriangleright}{\mathrel}{AMSA}{"42}
\DeclareMathSymbol{\vartriangleleft}{\mathrel}{AMSA}{"43}
\DeclareMathSymbol{\trianglerighteq}{\mathrel}{AMSA}{"44}
\DeclareMathSymbol{\trianglelefteq}{\mathrel}{AMSA}{"45}
\DeclareMathSymbol{\bigstar}       {\mathord}{AMSA}{"46}
\DeclareMathSymbol{\between}       {\mathrel}{AMSA}{"47}
\DeclareMathSymbol{\blacktriangledown}{\mathord}{AMSA}{"48}
\DeclareMathSymbol{\blacktriangleright}{\mathrel}{AMSA}{"49}
\DeclareMathSymbol{\blacktriangleleft}{\mathrel}{AMSA}{"4A}
\DeclareMathSymbol{\vartriangle}    {\mathrel}{AMSA}{"4D}
\DeclareMathSymbol{\blacktriangle}  {\mathord}{AMSA}{"4E}
\DeclareMathSymbol{\triangledown}   {\mathord}{AMSA}{"4F}
\DeclareMathSymbol{\eqcirc}        {\mathrel}{AMSA}{"50}
\DeclareMathSymbol{\lesseqgtr}     {\mathrel}{AMSA}{"51}
\DeclareMathSymbol{\gtreqless}     {\mathrel}{AMSA}{"52}
\DeclareMathSymbol{\lesseqqgtr}    {\mathrel}{AMSA}{"53}
\DeclareMathSymbol{\gtreqqless}    {\mathrel}{AMSA}{"54}
\DeclareMathSymbol{\Rrightarrow}   {\mathrel}{AMSA}{"56}
\DeclareMathSymbol{\Lleftarrow}    {\mathrel}{AMSA}{"57}
\DeclareMathSymbol{\veebar}        {\mathbin}{AMSA}{"59}
\DeclareMathSymbol{\barwedge}      {\mathbin}{AMSA}{"5A}
\DeclareMathSymbol{\doublebarwedge}{\mathbin}{AMSA}{"5B}
%% In amsfonts.sty
%%\DeclareMathSymbol{\angle}       {\mathord}{AMSA}{"5C}
\DeclareMathSymbol{\measuredangle}{\mathord}{AMSA}{"5D}
\DeclareMathSymbol{\sphericalangle}{\mathord}{AMSA}{"5E}
\DeclareMathSymbol{\varpropto}     {\mathrel}{AMSA}{"5F}
\DeclareMathSymbol{\smallsmile}    {\mathrel}{AMSA}{"60}
\DeclareMathSymbol{\smallfrown}    {\mathrel}{AMSA}{"61}
\DeclareMathSymbol{\Subset}        {\mathrel}{AMSA}{"62}
\DeclareMathSymbol{\Supset}        {\mathrel}{AMSA}{"63}
\DeclareMathSymbol{\Cup}           {\mathbin}{AMSA}{"64}
\global\let\doublecup\Cup

```

```

\DeclareMathSymbol{\Cap}          {\mathbin}{AMSA}{"65}
\global\let\doublecap\Cap
\DeclareMathSymbol{\curlywedge}   {\mathbin}{AMSA}{"66}
\DeclareMathSymbol{\curlyvee}    {\mathbin}{AMSA}{"67}
\DeclareMathSymbol{\leftthreetimes} {\mathbin}{AMSA}{"68}
\DeclareMathSymbol{\rightthreetimes} {\mathbin}{AMSA}{"69}
\DeclareMathSymbol{\subseteqq}    {\mathrel}{AMSA}{"6A}
\DeclareMathSymbol{\supseteqq}    {\mathrel}{AMSA}{"6B}
\DeclareMathSymbol{\bumpeq}      {\mathrel}{AMSA}{"6C}
\DeclareMathSymbol{\Bumpeq}      {\mathrel}{AMSA}{"6D}
\DeclareMathSymbol{\lll}        {\mathrel}{AMSA}{"6E}
\global\let\lless\lll
\DeclareMathSymbol{\ggg}        {\mathrel}{AMSA}{"6F}
\global\let\gggtr\ggg
\DeclareMathSymbol{\circledS}    {\mathord}{AMSA}{"73}
\DeclareMathSymbol{\pitchfork}   {\mathrel}{AMSA}{"74}
\DeclareMathSymbol{\dotplus}     {\mathbin}{AMSA}{"75}
\DeclareMathSymbol{\backsim}     {\mathrel}{AMSA}{"76}
\DeclareMathSymbol{\backsimeq}   {\mathrel}{AMSA}{"77}
\DeclareMathSymbol{\complement}  {\mathord}{AMSA}{"7B}
\DeclareMathSymbol{\intercal}    {\mathbin}{AMSA}{"7C}
\DeclareMathSymbol{\circledcirc} {\mathbin}{AMSA}{"7D}
\DeclareMathSymbol{\circledast}  {\mathbin}{AMSA}{"7E}
\DeclareMathSymbol{\circleddash} {\mathbin}{AMSA}{"7F}
%% Begin AMSb declarations
\DeclareMathSymbol{\lvertneqq}   {\mathrel}{AMSb}{"00}
\DeclareMathSymbol{\gvertneqq}   {\mathrel}{AMSb}{"01}
\DeclareMathSymbol{\nleq}        {\mathrel}{AMSb}{"02}
\DeclareMathSymbol{\ngeq}        {\mathrel}{AMSb}{"03}
\DeclareMathSymbol{\nless}       {\mathrel}{AMSb}{"04}
\DeclareMathSymbol{\ngtr}        {\mathrel}{AMSb}{"05}
\DeclareMathSymbol{\nprec}       {\mathrel}{AMSb}{"06}
\DeclareMathSymbol{\nsucc}       {\mathrel}{AMSb}{"07}
\DeclareMathSymbol{\lneqq}       {\mathrel}{AMSb}{"08}
\DeclareMathSymbol{\gneqq}       {\mathrel}{AMSb}{"09}
\DeclareMathSymbol{\nleqslant}   {\mathrel}{AMSb}{"0A}
\DeclareMathSymbol{\ngeqslant}   {\mathrel}{AMSb}{"0B}
\DeclareMathSymbol{\lneq}        {\mathrel}{AMSb}{"0C}
\DeclareMathSymbol{\gneq}        {\mathrel}{AMSb}{"0D}
\DeclareMathSymbol{\npreceq}     {\mathrel}{AMSb}{"0E}
\DeclareMathSymbol{\nsucceq}     {\mathrel}{AMSb}{"0F}
\DeclareMathSymbol{\precnsim}    {\mathrel}{AMSb}{"10}
\DeclareMathSymbol{\succnsim}    {\mathrel}{AMSb}{"11}
\DeclareMathSymbol{\lnsim}       {\mathrel}{AMSb}{"12}
\DeclareMathSymbol{\gnsim}       {\mathrel}{AMSb}{"13}
\DeclareMathSymbol{\nleqq}       {\mathrel}{AMSb}{"14}
\DeclareMathSymbol{\ngeqq}       {\mathrel}{AMSb}{"15}
\DeclareMathSymbol{\precneqq}    {\mathrel}{AMSb}{"16}
\DeclareMathSymbol{\succneqq}    {\mathrel}{AMSb}{"17}
\DeclareMathSymbol{\precnapprox} {\mathrel}{AMSb}{"18}

```

```

\DeclareMathSymbol{\succnapprox} {\mathrel}{AMSb}{"19}
\DeclareMathSymbol{\lnapprox} {\mathrel}{AMSb}{"1A}
\DeclareMathSymbol{\gnapprox} {\mathrel}{AMSb}{"1B}
\DeclareMathSymbol{\nsim} {\mathrel}{AMSb}{"1C}
\DeclareMathSymbol{\ncong} {\mathrel}{AMSb}{"1D}
\DeclareMathSymbol{\diagup} {\mathord}{AMSb}{"1E}
\DeclareMathSymbol{\diagdown} {\mathord}{AMSb}{"1F}
\DeclareMathSymbol{\varsubsetneq} {\mathrel}{AMSb}{"20}
\DeclareMathSymbol{\varsupsetneq} {\mathrel}{AMSb}{"21}
\DeclareMathSymbol{\nsubseteqq} {\mathrel}{AMSb}{"22}
\DeclareMathSymbol{\nsupseteqq} {\mathrel}{AMSb}{"23}
\DeclareMathSymbol{\subseteqq} {\mathrel}{AMSb}{"24}
\DeclareMathSymbol{\supseteqq} {\mathrel}{AMSb}{"25}
\DeclareMathSymbol{\varsubsetneqq} {\mathrel}{AMSb}{"26}
\DeclareMathSymbol{\varsupsetneqq} {\mathrel}{AMSb}{"27}
\DeclareMathSymbol{\subseteq} {\mathrel}{AMSb}{"28}
\DeclareMathSymbol{\supseteq} {\mathrel}{AMSb}{"29}
\DeclareMathSymbol{\nsubseteq} {\mathrel}{AMSb}{"2A}
\DeclareMathSymbol{\nsupseteq} {\mathrel}{AMSb}{"2B}
\DeclareMathSymbol{\nparallel} {\mathrel}{AMSb}{"2C}
\DeclareMathSymbol{\nmid} {\mathrel}{AMSb}{"2D}
\DeclareMathSymbol{\nshortmid} {\mathrel}{AMSb}{"2E}
\DeclareMathSymbol{\nshortparallel} {\mathrel}{AMSb}{"2F}
\DeclareMathSymbol{\nvdash} {\mathrel}{AMSb}{"30}
\DeclareMathSymbol{\nVdash} {\mathrel}{AMSb}{"31}
\DeclareMathSymbol{\nvDash} {\mathrel}{AMSb}{"32}
\DeclareMathSymbol{\nVDash} {\mathrel}{AMSb}{"33}
\DeclareMathSymbol{\ntrianglerighteq} {\mathrel}{AMSb}{"34}
\DeclareMathSymbol{\ntrianglelefteq} {\mathrel}{AMSb}{"35}
\DeclareMathSymbol{\ntriangleleft} {\mathrel}{AMSb}{"36}
\DeclareMathSymbol{\ntriangleright} {\mathrel}{AMSb}{"37}
\DeclareMathSymbol{\nleftarrow} {\mathrel}{AMSb}{"38}
\DeclareMathSymbol{\nrightarrow} {\mathrel}{AMSb}{"39}
\DeclareMathSymbol{\nLeftarrow} {\mathrel}{AMSb}{"3A}
\DeclareMathSymbol{\nRightarrow} {\mathrel}{AMSb}{"3B}
\DeclareMathSymbol{\nLeftrightarrow} {\mathrel}{AMSb}{"3C}
\DeclareMathSymbol{\nleftrightharpoonup} {\mathrel}{AMSb}{"3D}
\DeclareMathSymbol{\divideontimes} {\mathbin}{AMSb}{"3E}
\DeclareMathSymbol{\varnothing} {\mathord}{AMSb}{"3F}
\DeclareMathSymbol{\nexists} {\mathord}{AMSb}{"40}
\DeclareMathSymbol{\Finv} {\mathord}{AMSb}{"60}
\DeclareMathSymbol{\Game} {\mathord}{AMSb}{"61}
%% In amsfonts.sty:
%%\DeclareMathSymbol{\mho} {\mathord}{AMSb}{"66}
\DeclareMathSymbol{\eth} {\mathord}{AMSb}{"67}
\DeclareMathSymbol{\eqsim} {\mathrel}{AMSb}{"68}
\DeclareMathSymbol{\beth} {\mathord}{AMSb}{"69}
\DeclareMathSymbol{\gimel} {\mathord}{AMSb}{"6A}
\DeclareMathSymbol{\daleth} {\mathord}{AMSb}{"6B}
\DeclareMathSymbol{\lessdot} {\mathbin}{AMSb}{"6C}

```

```

\DeclareMathSymbol{\gtrdot}          {\mathbin}{AMSb}{"6D}
\DeclareMathSymbol{\ltimes}          {\mathbin}{AMSb}{"6E}
\DeclareMathSymbol{\rtimes}          {\mathbin}{AMSb}{"6F}
\DeclareMathSymbol{\shortmid}        {\mathrel}{AMSb}{"70}
\DeclareMathSymbol{\shortparallel}   {\mathrel}{AMSb}{"71}
\DeclareMathSymbol{\smallsetminus}   {\mathbin}{AMSb}{"72}
\DeclareMathSymbol{\thicksim}        {\mathrel}{AMSb}{"73}
\DeclareMathSymbol{\thickapprox}     {\mathrel}{AMSb}{"74}
\DeclareMathSymbol{\approx}          {\mathrel}{AMSb}{"75}
\DeclareMathSymbol{\succapprox}      {\mathrel}{AMSb}{"76}
\DeclareMathSymbol{\precapprox}      {\mathrel}{AMSb}{"77}
\DeclareMathSymbol{\curvearrowleft}  {\mathrel}{AMSb}{"78}
\DeclareMathSymbol{\curvearrowright} {\mathrel}{AMSb}{"79}
\DeclareMathSymbol{\digamma}         {\mathord}{AMSb}{"7A}
\DeclareMathSymbol{\varkappa}        {\mathord}{AMSb}{"7B}
\DeclareMathSymbol{\Bbbk}            {\mathord}{AMSb}{"7C}
\DeclareMathSymbol{\hslash}          {\mathord}{AMSb}{"7D}
%% In amsfonts.sty:
%%\DeclareMathSymbol{\hbar}           {\mathord}{AMSb}{"7E}
\DeclareMathSymbol{\backepsilon}     {\mathrel}{AMSb}{"7F}

```

Now we close the group so that " will get its old `\catcode` back.

```
\endgroup
```

The usual `\endinput` to ensure that random garbage at the end of the file doesn't get copied by `docstrip`.

```
\endinput
```