

The `amssymb` package

American Mathematical Society

Version 3.00, 2009/06/22

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}}
\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{\lesssim}           {\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{\subseteq}      {\mathrel}{AMSa}{"6A}
\DeclareMathSymbol{\supseteq}      {\mathrel}{AMSa}{"6B}
\DeclareMathSymbol{\bumpeq}        {\mathrel}{AMSa}{"6C}
\DeclareMathSymbol{\Bumpeq}        {\mathrel}{AMSa}{"6D}
\DeclareMathSymbol{\lll}          {\mathrel}{AMSa}{"6E}
\global\let\llless\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{\subsetneqq} {\mathrel}{AMSb}{24}
\DeclareMathSymbol{\supsetneqq} {\mathrel}{AMSb}{25}
\DeclareMathSymbol{\varsubsetneqq} {\mathrel}{AMSb}{26}
\DeclareMathSymbol{\varsupsetneqq} {\mathrel}{AMSb}{27}
\DeclareMathSymbol{\subsetneq} {\mathrel}{AMSb}{28}
\DeclareMathSymbol{\supsetneq} {\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
```