The eventB package*

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Abstract

This class provides a template for typesetting Event-B models. It was developed at the Swiss Federal Institute of Technology Zurich (ETH-Zurich).

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1 Introduction

This package was developed in order to ease the type setting of Event-B models in \LaTeX .

2 Usage

See sample-eventB.tex for an example of how to use the package.

3 Implementation

%%%%% BEGIN Package loading %%%%% \RequirePackage{xspace} \RequirePackage{xcolor} %%%% END Package loading %%%%%

%%%% Keywords can be coloured by package option "color" $\label{lem:command} $$ \operatorname{BØkeyword}_1]_{\ensuremath_BØkeyword}^1$

^{*}This document corresponds to eventB ?, dated ?.

```
\newcommand{\Bhspace}[1][2em]{\hspace{#1}}
\newcommand{\Bsep}{\quad}
\DeclareOption{color}{
  \colorlet{Bkeywordcolor}{blue}
  \colorlet{Blabelcolor}{green!50!black}
  \colorlet{Bpocolor}{red}
 %%%% Keywords are coloured.
  \renewcommand{\Bkeyword}[1]{\ensuremath{\textcolor{Bkeywordcolor}{\B@keyword{#1}}}\xspace}
  \renewcommand{\Blabel}[2][]{\ensuremath{\textcolor{Blabelcolor}{\B@label[#1]{#2}}}\xspace}
  \renewcommand{\Bpo}[1]{\ensuremath{\textcolor{Bpocolor}{\B@po{#1}}}\xspace}
}
\DeclareOption{colour}{
  \colorlet{Bkeywordcolor}{blue}
  \colorlet{Blabelcolor}{green!50!black}
  \colorlet{Bpocolor}{red}
  %%%% Keywords are coloured.
  \renewcommand{\Blabel}[2][]{\ensuremath{\textcolor{Blabelcolor}{\B@label[#1]{#2}}}\xspace}
  \renewcommand{\Bpo}[1]{\ensuremath{\textcolor{Bpocolor}{\B@po{#1}}}\xspace}
}
\newcommand{\B@identifier}[1]{\ensuremath{\mathit{#1}}\xspace}
\newcommand{\B@label}[2][]{
  \def\is@thm{#1}
  \ifx\is@thm\@empty
  \ensuremath{\mathsf{#2}}\xspace
  \ensuremath{\mathit{#2}}\xspace
  \fi
}
%%%%% Bcode environment %%%%%%
\%\%\%\% the same as ''center'' \%\%\%\%\%
\newenvironment{Bcode}[1][\normalsize]{\begin{center}#1}{\end{center}}
\newcommand{\Bdeclaration}[2]{
  \fbox{
   \ensuremath{
     \B@declaration{#1}{#2}
   }
 }
}
\newcommand{\Bsection}[3][]{
  \setlength{\B@oldfboxsep}{\fboxsep}
 \setlength{\fboxsep}{2ex}
  \fbox{
   \ensuremath{
     \B@section[#1]{#2}{#3}
   }
  \setlength{\fboxsep}{\B@oldfboxsep}
```

```
\newcommand{\event}[7][]{
  \setlength{\B@oldfboxsep}{\fboxsep}
  \setlength{\fboxsep}{2ex}
  \fbox{
    \ensuremath{
      \B@event[#1]{#2}{#3}{#4}{#5}{#6}{#7}
    }
 }
  \setlength{\fboxsep}{\B@oldfboxsep}
}
\newcommand{\eventinline}[7][]{
  \setlength{\B@oldfboxsep}{\fboxsep}
  \setlength{\fboxsep}{2ex}
  \fbox{}
    \ensuremath{
      \B@eventinline[#1]{#2}{#3}{#4}{#5}{#6}{#7}
  \DeclareOption{compact}{
  \renewenvironment{Bcode}[1][\footnotesize]{\begin{center}#1}{\end{center}}
  \renewcommand{\Bdeclaration}[2]{
    \B@declaration{#1}{#2}
 }
  \renewcommand{\Bsection}[3][]{
    \B@section[#1]{#2}{#3}
 }
  \renewcommand{\event}[7][]{
    \verb|\B@event[#1]{#2}{#3}{#4}{#5}{#6}{#7}|
  \renewcommand{\eventinline}[7][]{
    \B@eventinline[#1]{#2}{#3}{#4}{#5}{#6}{#7}
  }
  \mbox{renewcommand{\Bvspace}[1][0ex]{\[#1]}}
  \renewcommand{\Bhspace}[1][0.5em]{\hspace{#1}}
  \renewcommand{\Bsep}{\}
}
\DeclareOption{small}{
  \renewenvironment{Bcode}[1][\footnotesize]{\begin{center}#1}{\end{center}}
  \mbox{renewcommand{\Bvspace}[1][1ex]{\[#1]}}
  \renewcommand{\Bhspace}[1][1em]{\hspace{#1}}
  \renewcommand{\Bdeclaration}[2]{
    \B@declaration{#1}{#2}
  \renewcommand{\Bsection}[3][]{
```

```
\B@section[#1]{#2}{#3}
 }
  \renewcommand{\event}[7][]{
    B@event[#1]{#2}{#3}{#4}{#5}{#6}{#7}
  \renewcommand{\eventinline}[7][]{
    \B@eventinline[#1]{#2}{#3}{#4}{#5}{#6}{#7}
  \renewcommand{\Bsep}{\}
\DeclareOption{tiny}{
  \renewenvironment{Bcode}[1][\scriptsize]{\begin{center}#1}{\end{center}}
  \mbox{renewcommand{\Bvspace}[1][-0.5ex]{\[#1]}}
  \renewcommand{\Bhspace}[1][0.5em]{\hspace{#1}}
  \renewcommand{\Bdeclaration}[2]{
    \B@declaration{#1}{#2}
 }
  \renewcommand{\Bsection}[3][]{
    \B@section[#1]{#2}{#3}
 }
  \renewcommand{\event}[7][]{
    \B@event[#1]{#2}{#3}{#4}{#5}{#6}{#7}
  }
  \renewcommand{\eventinline}[7][]{
    \B@eventinline[#1]{#2}{#3}{#4}{#5}{#6}{#7}
  }
  \renewcommand{\Bsep}{\ }
}
\newcommand{\B@declaration}[2]{
  \begin{array}{10{\Bsep}1}
    \Bkeyword{#1:} & #2
  \end{array}
}
\newlength{\B@oldfboxsep}
\newcommand{\B@section}[3][]{
  \def\no@title{#1}
  \ifx\no@title\@empty
  \begin{array}{1}
    \Bkeyword{#2:} \\
    \begin{array}{10{\Bsep}1}
      #3
    \end{array}
  \end{array}
  \else
  \begin{array}{1@{\Bsep}1}
   #3
```

```
\end{array}
  \fi
}
%%%% BEGIN Execution of options %%%%%
\ProcessOptions
%%%% END Execution of options %%%%%
%%%%% (BEGIN) Macros for Pretty-Print Event-B Components %%%
\newcommand{\eventB}{Event-B\xspace}
\newcommand{\SKIP}{\textsc{skip}}}
%%%% Event-B Keywords %%%%%
\newcommand{\Bany}{\Bkeyword{any}}
\newcommand{\Bbegin}{\Bkeyword{begin}}
\newcommand{\Bend}{\Bkeyword{end}}
\newcommand{\Brefines}{\Bkeyword{refines}}
\newcommand{\Bstatus}{\Bkeyword{status}}
\newcommand{\Bthen}{\Bkeyword{then}}
\newcommand{\Bwhen}{\Bkeyword{when}}
\newcommand{\Bwhere}{\Bkeyword{where}}
\newcommand{\Bwith}{\Bkeyword{with}}
%%%% Event-B internal elements %%%%%
\newcommand{\Bset}[1]{\Bidentifier{#1}}
\newcommand{\Bcst}[1]{\Bidentifier{#1}}
\label{Baxm} [1] {\Blabel{#1}}
\newcommand{\Bthm}[1]{\Blabel[thm]{#1}}
\newcommand{\Bvrb}[1]{\Bidentifier{#1}}
\label{Binv} [1] {\label{#1}}
\label{Bevt} $$ \operatorname{\mathbb{I}}_{\mathbb{I}} \
\newcommand{\Bpar}[1]{\Bidentifier{#1}}
\label{Bact} $$ \operatorname{\mathbb{L}} {\Blabel{#1}} $$
\newcommand{\Bgrd}[1]{\Blabel{#1}}
\newcommand{\Bbap}[1]{\hbox{\sl\bfseries #1}}
%%%%
%%%% Creating Event-B elements macros %%%%%
%%%%% Create a new B macro
%%%%% Arguments:
%%%%% 1. The macro string, (OPTIONAL) if empty then the expanded string will be used.
%%%%% 2. The expanded string
%%%%% 3. The mark-up macros, e.g. \Bvrb
%%%%% Usage:
\%\%\% - \B@newmacro[aaa]{a\_a\_a}{\Bvrb} will create a new macro \aaa
%%%% which will be expanded to be \Bvrb{a\_a\_a}
%%%%% - \B@newmacro{aaa}{\Bvrb} will create a new macro \aaa
%%%% which will be expanded to be \Bvrb{aaa}
```

```
%%%%%%
\newcommand{\B@newmacro}[3][]{
     \def\input@macro{#1}
     \ifx\input@macro\@empty
     \expandafter\def\csname #2\endcsname{#3{#2}}
     \expandafter\def\csname #1\endcsname{#3{#2}}
     \fi
}
%%%%% Create a new context macro
%%%%% Arguments:
%%%%% 1. The macro string (OPTIONAL)
%%%%% 2. The expanded string
%%%%% Usage:
\%\%\%\% - \newBctx[aaa]{a\_a\_a} will create a new macro \aaa
\hfill \%\%\%\% which will be expanded to be \Bctx{a\_a\_a}.
%%%%% - \newBctx{aaa} will create a new macro \aaa which will be
%%%% expanded to be \Bctx{aaa}.
%%%%%
\newcommand{\newBctx}[2][]{%
     \B@newmacro[#1]{#2}{\Bctx}
%%%%% Create a new carrier set macro
%%%%% Arguments:
%%%%% 1. The macro string (OPTIONAL)
%%%%% 2. The expanded string
%%%%% Usage:
\%\%\% - \newBset[aaa]{a\_a\_a} will create a new macro \aaa
%%%% which will be expanded to be Bset{a\_a\_a}.
\%\%\%\% - \newBset{aaa} will create a new macro \aaa which will be
%%%%% expanded to be \Bset{aaa}.
%%%%%
\newcommand{\newBset}[2][]{%
     \B@newmacro[#1]{#2}{\Bset}
%%%%% Create a new constant macro
%%%%% Arguments:
%%%%% 1. The macro string (OPTIONAL)
%%%%% 2. The expanded string
%%%%% Usage:
\%\%\% - \newBcst[aaa]{a\_a\_a} will create a new macro \aaa
\%\%\% which will be expanded to be \Bcst{a\_a\_a}.
\hfill 
\%\%\%\% expanded to be \Bcst{aaa}.
%%%%%
\newcommand{\newBcst}[2][]{%
     \B@newmacro[#1]{#2}{\Bcst}
%%%%% Create a new axiom macro
```

```
%%%%% Arguments:
%%%%% 1. The macro string (OPTIONAL)
%%%%% 2. The expanded string
%%%%% Usage:
%%%%% which will be expanded to be Baxm{a\_a\_a}.
%%%%% - \newBaxm{aaa} will create a new macro \aaa which will be
%%%% expanded to be \Baxm{aaa}.
%%%%%
\newcommand{\newBaxm}[2][]{%
  \B@newmacro[#1]{#2}{\Baxm}
%%%% Create a new theorem macro
%%%%% Arguments:
%%%%% 1. The macro string (OPTIONAL)
%%%%% 2. The expanded string
%%%% Usage:
\%\%\%\% - \newBthm[aaa]{a\_a\_a} will create a new macro \aaa
\%\%\%\% which will be expanded to be \beta-a_a.
%%%%% - \newBthm{aaa} will create a new macro \aaa which will be
%%%% expanded to be \Bthm{aaa}.
%%%%%
\newcommand{\newBthm}[2][]{%
  \B@newmacro[#1]{#2}{\Bthm}
%%%% Create a new machine macro
%%%%% Arguments:
\ensuremath{\mbox{\%}\mbox{\%}\mbox{\%}}\mbox{\%} 1. The macro string (OPTIONAL)
%%%%% 2. The expanded string
%%%%% Usage:
\%\%\% - \newBmch[aaa]{a\_a\_a} will create a new macro \aaa
%%%% which will be expanded to be Bmch\{a\_a\_a\}.
%%%%% - \newBmch{aaa} will create a new macro \aaa which will be
\%\%\%\% expanded to be Bmch{aaa}.
%%%%%
\newcommand{\newBmch}[2][]{%
  \B@newmacro[#1]{#2}{\Bmch}
%%%%% Create a new variable macro
%%%%% Arguments:
%%%%% 1. The macro string (OPTIONAL)
%%%%% 2. The expanded string
%%%%% Usage:
\%\%\%\% - \newBvrb[aaa]{a\_a\_a} will create a new macro \aaa
%%%%% which will be expanded to be \Bvrb{a\_a\_a}.
\%\%\%\% - \newBvrb{aaa} will create a new macro \aaa which will be
%%%% expanded to be \Bvrb{aaa}.
%%%%%
\newcommand{\newBvrb}[2][]{%
 \B@newmacro[#1]{#2}{\Bvrb}
```

```
}
%%%%% Create a new invariant macro
%%%%% Arguments:
%%%%% 1. The macro string (OPTIONAL)
\%\%\% 2. The expanded string
%%%%% Usage:
\%\%\%\% - \newBinv[aaa]{a\_a\_a} will create a new macro \aaa
%%%%% which will be expanded to be \left[a\_a\_a\right].
%%%%% - \newBinv{aaa} will create a new macro \aaa which will be
\%\%\%\% expanded to be \pi
%%%%%
\newcommand{\newBinv}[2][]{%
    \B@newmacro[#1]{#2}{\Binv}
%%%%% Create a new event macro
%%%%% Arguments:
\ensuremath{\mbox{\%}\mbox{\%}\mbox{\%}}\mbox{\%} 1. The macro string (OPTIONAL)
%%%%% 2. The expanded string
%%%%% Usage:
\%\%\%\% - \newBevt[aaa]{a\_a\_a} will create a new macro \aaa
%%%%% which will be expanded to be \Bevt{a\_a\_a}.
\%\%\%\% - \newBevt{aaa} will create a new macro \aaa which will be
%%%%% expanded to be \Bevt{aaa}.
%%%%%
\newcommand{\newBevt}[2][]{%
    \B@newmacro[#1]{#2}{\Bevt}
%%%%% Create a new parameter macro
%%%%% Arguments:
%%%%% 1. The macro string (OPTIONAL)
%%%%% 2. The expanded string
%%%%% Usage:
\hfill 
%%%% which will be expanded to be Bpar\{a\_a\}.
%%%%% - \newBpar{aaa} will create a new macro \aaa which will be
%%%%% expanded to be \Bpar{aaa}.
%%%%%
\newcommand{\newBpar}[2][]{%
    \B@newmacro[#1]{#2}{\Bpar}
%%%%% Create a new guard macro
%%%%% Arguments:
\ensuremath{\mbox{\%}\mbox{\%}\mbox{\%}}\mbox{\%} 1. The macro string (OPTIONAL)
%%%%% 2. The expanded string
%%%%% Usage:
\%\%\%\% - \newBgrd[aaa]{a\_a\_a} will create a new macro \aaa
\hfill \%\%\%\% which will be expanded to be \Bgrd{a\_a\_a}.
%%%%% - \newBgrd{aaa} will create a new macro \aaa which will be
%%%%% expanded to be \Bgrd{aaa}.
```

```
%%%%%
\newcommand{\newBgrd}[2][]{%
  \B@newmacro[#1]{#2}{\Bgrd}
%%%%% Create a new action macro
%%%%% Arguments:
\%\%\% 1. The macro string (OPTIONAL)
%%%%% 2. The expanded string
%%%%% Usage:
\%\%\%\% - \newBact[aaa]{a\_a\_a} will create a new macro \aaa
\%\%\% which will be expanded to be Bact{a\_a\_a}.
\%\%\%\% - \newBact{aaa} will create a new macro \aaa which will be
%%%% expanded to be \Bact{aaa}.
%%%%%
\newcommand{\newBact}[2][]{%
  \B@newmacro[#1]{#2}{\Bact}
\protect\ensuremath{\text{\%}}\protect\ensuremath{\text{\%}}\protect\ensuremath{\text{\%}}\protect\ensuremath{\text{W}}\protect\ensuremath{\text{Carrier}} Rests carrier sets
%%%%% Arguments:
%%%%% 1. (Comma-separated) list of carrier sets.
%%%%%
%%%%% Usage: \carriersets{S, T}
\newcommand{\carriersets}[1]{
  \Bdeclaration{sets}{#1}
%%%%% Pretty print constants
%%%%% Arguments:
\%\%\% 1. (Comma-separated) list of constants.
%%%%%
%%%%% Usage: \constants{m, n}
\newcommand{\constants}[1]{
  \Bdeclaration{constants}{#1}
%%%%% Pretty print axioms
%%%%% Arguments:
%%%%% 1. (Newline(\\)-separated) list of axioms.
%%%%%
\%\%\% Usage: \axioms{\Baxm{axm0\_1}: & x \in \nat \\
%%%%%
                       \Delta 0_2: & y \in \nat \\[2ex]}
\newcommand{\axioms}[2][]{
  \Bsection[#1]{axioms}{#2}
%%%%% Pretty print variables
%%%%% Arguments:
%%%%% 1. (Comma-separated) list of variables.
%%%%%
%%%%% Usage: \variables{x, y}
\newcommand{\variables}[1]{
```

```
\Bdeclaration{variables}{#1}
%%%%% Pretty print invariants
%%%%% Arguments:
%%%%% 1. (Newline(\\)-separated) list of invariants.
%%%%%
\%\%\% Usage: \invariants{\Binv{inv0\_1:} & x \in \nat \\
                         \Binv{inv0\_2:} & y \in \n \in \([2ex])
\newcommand{\invariants}[2][]{
  \Bsection[#1]{invariants}{#2}
%%%%% Pretty print variant
%%%%% Arguments:
%%%%% 1. The variant
%%%%%
%%%%% Usage: \variant{V}
\newcommand{\variant}[1]{
 \Bdeclaration{variant}{#1}
%%%%% Pretty print an general Event-B event
%%%%% Arguments:
%%%%% 1. (Optional) convergence status.
%%%%% 2. Name of the event.
%%%%% 3. Name of the abstract event.
%%%% 4. (Comma-separated) list of parameters.
%%%%% 5. (Newline(\\)-separated) list of guards.
%%%%% 6. (Newline(\\)-separated) list of witness predicates.
%%%%% 7. (Newline(\\)-separated) list of assignments.
%%%%%
%%%%% Usage: B@event[conv]{conc}{abs}{x,y}{G1(x,y)}{G2(x,y)}{W1}W2}{S1(v,x,y)}\S2(w,x,y)}
%%%%%
            will produce the following
%%%%%
%%%%%
            conc
%%%%%
            refines abs
%%%%%
            status conv
%%%%%
            any x, y where
%%%%%
              G1(x, y)
%%%%%
              G2(x, y)
%%%%%
            with
%%%%%
              W1
%%%%%
              W2
%%%%%
            then
%%%%%
              S1(v, x, y)
%%%%%
              S2(w, x, y)
%%%%%
            end
%%%%%
%%%%% Special case:
%%%%% - Empty abstract event --> refines clause is omitted.
%%%%% - Empty convergence status --> status clause is omitted.
%%%%% - Empty witness --> with clause is omitted.
```

```
\ensuremath{\mbox{\%}\mbox{\%}\mbox{\%}}\mbox{\mbox{\mbox{$\sim$}}} --> begin ... end
\%\%\%\% - Empty parameters --> when ... then ... end
%%%%% - Empty actions --> \SKIP
\newcommand{\B@event}[7][]{
  \def\evt@sts{#1}
  \def\evt@name{#2}
  \def\evt@absevts{#3}
  \def\evt@pars{#4}
  \def\evt@grds{#5}
  \def\evt@wits{#6}
  \def\evt@acts{#7}
  %% Pretty-print convergence status
  \ifx\evt@sts\@empty
  \def\pretty@sts{}
  \else
  \def\pretty@sts{\Bsep\Bstatus \Bsep \evt@sts \\}
  % Pretty-print abstract events
  \ifx\evt@absevts\@empty
  \def\pretty@absevts{}
  \else
  \def\pretty@absevts{\Bsep\Brefines \Bsep \evt@absevts \\}
  \fi
  % Pretty-print parameters
  \ifx\evt@pars\@empty
  \def\pretty@pars{}
  \else
  \def\pretty@pars{\Bsep\Bany \Bsep \evt@pars \Bsep \Bwhere \\}
  % Pretty-print guards
  \ifx\evt@grds\@empty
  \def\pretty@grds{}
  \else
  \def\evt@grds@tmp{
    \begin{array}{@{\Bsep\Bsep}1@{\Bsep}1}
      \evt@grds
    \end{array}\\
  \ifx\evt@pars\@empty
  \def\pretty@grds{
    \Bsep \Bwhen \\
    \evt@grds@tmp
  }
  \else
  \def\pretty@grds{\evt@grds@tmp}
  \fi
  \fi
  % Pretty-print witnesses
  \ifx\evt@wits\@empty
  \def\pretty@wits{}
  \else
  \def\pretty@wits{
    \Bsep\Bwith\\
    \begin{array}{@{\Bsep\Bsep}11}\\
```

```
\evt@wits
           \end{array}\\
     }
     \fi
     % Pretty-print actions
     \ifx\evt@acts\@empty
     \def\evt@acts{\SKIP}
     \else
     \fi
      \def\evt@acts@tmp{
           \begin{array}{@{\Bsep\Bsep}1@{\Bsep}1}
                 \evt@acts
           \end{array}\\
     }
      \def\evt@acts@keyword{\Bsep\Bthen \\}
     \ifx\evt@pars\@empty
      \ifx\evt@grds\@empty
      \def\evt@acts@keyword{\Bsep\Bbegin \\}
      \else
     \fi
      \else
     \fi
      \def\pretty@acts{
           \evt@acts@keyword
           \evt@acts@tmp
     % Really do it now
      \begin{array}{1}
           \Bevt{\evt@name} \\
           \pretty@sts
           \pretty@absevts
           \pretty@pars
           \pretty@grds
           \pretty@wits
           \pretty@acts
           \Bsep\Bend
      \end{array}
%%%%% Pretty print an general Event-B event
%%%%% Arguments:
%%%%% 1. (Optional) convergence status.
%%%%% 2. Name of the event.
%%%%% 3. Name of the abstract event.
%%%% 4. (Comma-separated) list of parameters.
%%%%% 5. (Newline(\\)-separated) list of guards.
%%%%% 6. (Newline(\\)-separated) list of witness predicates.
\%\%\% 7. (Newline(\\)-separated) list of assignments.
%%%%%
\label{local_conv} $$ \W1\W2}_{S1(v,x,y)\S2(w,x,y)} $$ \W1\W2}_{S1(v,x,y)\S2(w,x,y)}_{W1\W2}_{S1(v,x,y)\S2(w,x,y)}_{W1\W2}_{S1(v,x,y)\S2(w,x,y)}_{W1\W2}_{S1(v,x,y)\S2(w,x,y)}_{W1\W2}_{S1(v,x,y)\S2(w,x,y)}_{W1\W2}_{S1(v,x,y)\S2(w,x,y)}_{W1\W2}_{S1(v,x,y)\S2(w,x,y)}_{W1\W2}_{S1(v,x,y)\S2(w,x,y)}_{W1\W2}_{S1(v,x,y)\S2(w,x,y)}_{W1\W2}_{S1(v,x,y)\W2}_{W1\W2}_{S1(v,x,y)\W2}_{W1\W2}_{S1(v,x,y)}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W2}_{W1\W
%%%%%
                                  will produce the following
%%%%%
%%%%%
                                  conc
%%%%%
                                  refines abs
```

```
%%%%%
            status conv
%%%%%
            any x, y where
%%%%%
              G1(x, y)
              G2(x, y)
%%%%%
%%%%%
            with
%%%%%
              W1
%%%%%
              W2
%%%%%
            then
%%%%%
              S1(v, x, y)
%%%%%
              S2(w, x, y)
%%%%%
            end
%%%%%
%%%%% Special case:
%%%%% - Empty abstract event --> refines clause is omitted.
\%\%\%\% - Empty convergence status --> status clause is omitted.
\%\%\%\% - Empty witness --> with clause is omitted.
%%%%% - Empty parameters, empty guards --> begin ... end
\%\%\% - Empty parameters --> when ... then ... end
%%%%% - Empty actions --> \SKIP
\newcommand{\B@eventinline}[7][]{
  \def\evt@sts{#1}
  \def\evt@name{#2}
  \def\evt@absevts{#3}
  \def\evt@pars{#4}
  \def\evt@grds{#5}
  \def\evt@wits{#6}
  \def\evt@acts{#7}
  %% Ignore convergence status
  \def\pretty@sts{}
  \% Pretty-print abstract events
  \ifx\evt@absevts\@empty
  \def\pretty@absevts{}
  \else
  \def\pretty@absevts{\Brefines~\evt@absevts~}
  % Pretty-print parameters
  \ifx\evt@pars\@empty
  \def\pretty@pars{}
  \else
  \def\pretty@pars{\Bany~\evt@pars~\Bwhere~}
  \fi
  % Pretty-print guards
  \ifx\evt@grds\@empty
  \def\pretty@grds{}
  \else
  \def\evt@grds@tmp{
      \evt@grds
  \ifx\evt@pars\@empty
  \def\pretty@grds{
    \Bwhen~
    \evt@grds@tmp~
  }
  \else
```

```
\def\pretty@grds{\evt@grds@tmp~}
  \fi
  \fi
  % Pretty-print witnesses
  \ifx\evt@wits\@empty
  \def\pretty@wits{}
  \else
  \def\pretty@wits{
    \Bwith~
    \evt@wits~
 }
 \fi
 \% Pretty-print actions
  \ifx\evt@acts\@empty
  \def\evt@acts{\SKIP}
  \else
  \fi
  \def\evt@acts@tmp{
    \evt@acts
  }
  \verb|\def|\evt@acts@keyword{\Bthen}|
  \ifx\evt@pars\@empty
  \ifx\evt@grds\@empty
  \def\evt@acts@keyword{\Bbegin}
  \else
  \fi
  \else
  \fi
  \def\pretty@acts{
   \evt@acts@keyword~
   \evt@acts@tmp~
  }
  % Really do it now
  \begin{array}{1}
    \Bevt{\evt@name}~\widehat{=}~
    \pretty@sts
    \pretty@absevts
    \pretty@pars
    \pretty@grds
    \pretty@wits
    \pretty@acts
    \Bend
  \end{array}
%%%%% INITIALISATION label
\newBevt{init}
%%%%% Pretty print the initialisation: no ''refines'' clause. no parameters, no
%%%%% guards
%%%%% Arguments:
%%%%% 1. (Newline(\\)-separated) list of assignments.
%%%% Usage: \init{S1(v,x,y)\\S2(w,x,y)}
```

```
will produce the following
%%%%%
%%%%%
%%%%%
          init
%%%%%
          begin
            S1(v, x, y)
%%%%%
%%%%%
            S2(w, x, y)
%%%%%
%%%%%
\newcommand{\initialisation}[1]{
 %%%%% Theorem Proof Obligation
%%%%% Print the theorem proof obligation, given the theorem label.
%%%%% Arguments:
%%%%% 1. Theorem label
%%%%%
%%%%% Usage:
\%\%\% - \thmpo{thm} will produce "thm/THM"
%%%% Axiom Well-definedness Proof Obligation
\%\%\%\% Print the axiom well-definedness proof obligation, given the
%%%%% axiom label.
%%%%% Arguments:
%%%%% 1. Axiom label
%%%%%
%%%%% Usage:
%%%%% - \axmwdpo{axm} will produce "axm/WD"
%%%%% Invariant Proof Obligation
\%\%\% Print the invariant proof obligation, given the event name and
%%%%% invariant label
%%%%% Arguments:
%%%%% 1. Event name
%%%%% 2. Invariant label
%%%%%
%%%%% Usage:
%%%%% - \invpo{evt}{inv} will produce "evt/inv/INV"
\label{linvpo} $$ \operatorname{linvpo}[2]_{\Bevt{\#1}/\Binv{\#2}/\Bpo{INV}} $$
%%%%% Theorem (in guard) Proof Obligation
%%%%% Print the simulation proof obligation, given the event name and
%%%%% the theorem (in guard) label.
%%%%% Arguments:
%%%%% 1. Event name
\%\%\% 2. Theorem (in guard) label
%%%%%
%%%%% Usage:
%%%%% - \grdthmpo{evt}{thm} will produce "evt/thm/THM"
```

```
%%%%% Feasibility Proof Obligation
\%\%\%\% Print the feasibility proof obligation, given the event name and
%%%%% the action label
%%%%% Arguments:
%%%%% 1. Event name
%%%%% 2. Action label
%%%%%
%%%%% Usage:
%%%%% - \fispo{evt}{act} will produce "evt/act/FIS"
%%%%% Variant finiteness Proof Obligation
%%%% Print the Variant finiteness proof obligation
%%%%% Arguments: No arguments
%%%%%
%%%%% Usage:
%%%%% - \finpo will produce "FIN"
\newcommand{\finpo}{\Bpo{FIN}}
%%%%% Variant Proof Obligation
%%%%% Print the guard strengthen proof obligation, given the event name
%%%%% Arguments:
%%%%% 1. Event name
%%%%%
%%%%% Usage:
%%%%% - \grdpo{evt} will produce "evt/VAR"
%%%%% Simulation Proof Obligation
%%%%% Print the simulation proof obligation, given the event name and
%%%%% the action label.
%%%%% Arguments:
%%%%% 1. Event name
%%%%% 2. Action label
%%%%%
%%%% Usage:
%%%%% - \simpo{evt}{act} will produce "evt/act/SIM"
%%%% Guard Strengthen Proof Obligation
%%%%% Print the guard strengthen proof obligation, given the event
%%%%% name and the guard label
%%%%% Arguments:
%%%%% 1. (Abstract) Event name
%%%%% 2. (Abstract) Guard label
%%%%%
%%%% Usage:
%%%%% - \grdpo{evt}{grd} will produce "evt/grd/GRD"
%%%%% Variant Natural Number Proof Obligation
%%%%% Print the Variant Natural Number proof obligation, given the event name
```

```
%%%%% Arguments:
%%%%% 1. Event name
%%%%%
%%%%% Usage:
%%%%% - \natpo{evt} will produce "evt/NAT"
\newcommand{\natpo}[1]{\Bevt{#1}/\Bpo{NAT}}
```

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Change History					
v1.0 General: Initial version		Ensure that the keywords, are in math-mode 1			