

The Bloques Package

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I. Functions

The bloques package is a very simple set of commands based on tikz to generate control blocks. The only packages required in the definition are:

```
\usepackage{tikz}
\usepackage{bloques}
```

The package is very efficient for sequential blocks as follow:

- `\bStart{TEXT}` a start node without box
- `\bGain[mark]{TEXT}` a gain with box and a input mark before it
- `\bEnd{TEXT}` a start node without box
- `\bGainPlus{TEXT1}{TEXT2}` a gain(TEXT2) and plus mixer with input (TEXT1)
- `\bGainMinus{TEXT1}{TEXT2}` a gain(TEXT2) and minus mixer with input (TEXT1)
- `\bPlus[mark]{NODENAME}` a L-U plus mixer with name (NODENAME) and a input mark before it for feed
- `\bMinus[mark]{NODENAME}` a L-U minus mixer with name (NODENAME) and a input mark before it for feed
- `\bPlusLR[mark]{NODENAME}` a L-R plus mixer with name (NODENAME) and a input mark before it for feed
- `\bMinusLR[mark]{NODENAME}` a L-R minus mixer with name (NODENAME) and a input mark before it for feed
- `\bPlusF[mark]{NODENAME}` a L-D plus mixer with name (NODENAME) for feed backward and a input mark before it
- `\bMinusF[mark]{NODENAME}` a L-D minus mixer with name (NODENAME) for feed backward and a input mark before it
- `\bPlusDown{TEXT}` a plus mixer with a down input(TEXT)
- `\bPlusUp{TEXT}` a plus mixer with a up input(TEXT)
- `\bMinusDown{TEXT}` a minus mixer with a down input(TEXT)
- `\bMinusUp{TEXT}` a minus mixer with a up input(TEXT)
- `\bMultiplyDown{TEXT}` a multiply mixer with a down input(TEXT)

IF want to start a new sequential blocks use these command:

- `\bNewStart{TEXT}{POSITION}` a new start node with text(TEXT) at (POSITION)
- `\bMarkNode{NODENAME}` add a mark node with name NODENAME for the previous node
- `\bMarkNodeUp{NODENAME}` add a mark node with name NODENAME above ydistance of the previous node
- `\bMarkNodeDown{NODENAME}` add a mark node with name NODENAME below ydistance of the previous node
- `\bInter[mark]{TEXT}` a no sep-space inter node with text (TEXT1) and a previous (mark) for feed forward
- `\bMarkNodeInter{NODENAME}` a no sep-space inter node with name (NODENAME) for feed forward
- `\bNewInter{TEXT}{POSITION}` a new inter node with text(TEXT) at (POSITION) like new start node but with no sep-space
- `\bFeedForward{TEXT}{NODE1}{NODE2}` a feed forward with gain (TEXT) from node (NODE1) to node (NODE2)
- `\bCrossGain{TEXT}{NODENAME1}{NODENAME2}` a cross gain with gain(TEXT) from node (NODENAME1) to node (NODENAME2)
- `\bLink{NODENAME1}{NODENAME2}` a Line link from node (NODENAME1) to node (NODENAME2)
- `\bLinkhv{NODENAME1}{NODENAME2}` a H-V Line link from node (NODENAME1) to node (NODENAME2)
- `\bLinkvh{NODENAME1}{NODENAME2}` a V-H Line link from node (NODENAME1) to node (NODENAME2)

For Feedback controls, it is required to mark the nodes with the following functions:

- `\bFeedBack{TEXT}{NODENAME}` a feed backward with gain(TEXT) at below left to a mixer with name (NODENAME)
- `\bFeedBackA{TEXT}{NODENAME}` a feed backward with gain(TEXT) at above left to a mixer with name (NODENAME)

- `\bFeedBackvhv{TEXT}{NODENAME}` a feed backward with gain(TEXT) at below left to a mixer with name (NODENAME) and link line start from the south anchor of the previous node
- `\bFeedBackAvhv{TEXT}{NODENAME}` a feed backward with gain(TEXT) at above left to a mixer with name (NODENAME) and link line start from the north anchor of the previous node

To change colors and distances, the following functions are available

```

\bShadow{NUMBER} % default = 0 shadow of node
\bColorB{COLOR} % default = white, back color of node
\bColorT{COLOR} % default = black, text color of node
\bLineL{Linestyle} % default is none, more styles like dashed,double can be set
\bArrow{Arrowstyle} % default is latex, more styles like stealth,Latex,Stealth can be set
\ydistance{Length} % default = 1.2 cm, offset distance of y direction
\restoreydis % recover to default of the offset distance of y direction
\xdistance{Length} % default = 1.5 cm, offset distance of x direction
\restorexdis % recover to default of the offset distance of x direction

```

II. examples

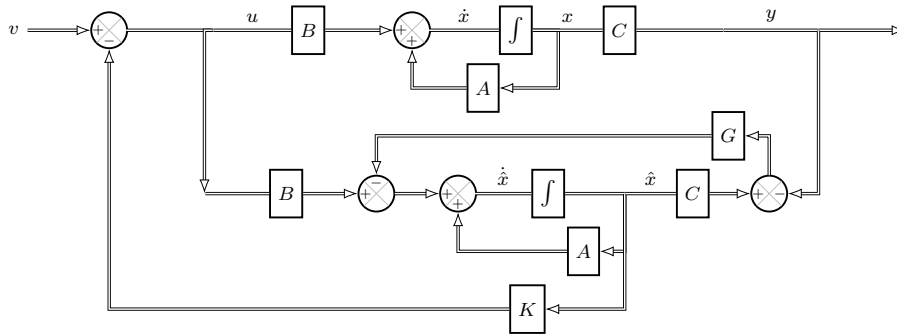


Fig. 1. a feed back system with full dimension observer

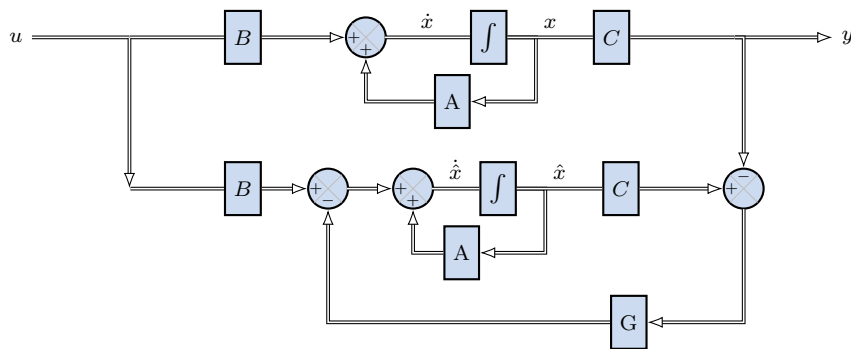


Fig. 2. a state observer of a system

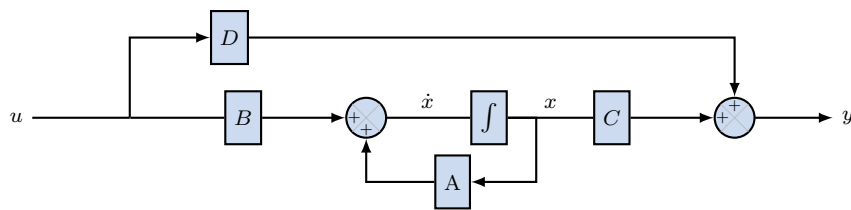


Fig. 3. A system state variables diagram

```

\begin{figure}
\begin{tikzpicture}
\bcColorB{blue!70!green!20}
\bStart{$u$}
\bInter{}
\bMarkNodeInter{NODEU}
\bGain{$B$}
\bMinusF{NODEX}
\bGain[$\dot{x}$]{\int}
\bFeedBack{A}{NODEX}
\bGain[$x$]{$C$}
\bPlus{NODEY}
\bFeedForward{$D$}{NODEU}{NODEY}
\bEnd{$y$}
\end{tikzpicture}
\end{figure}

```

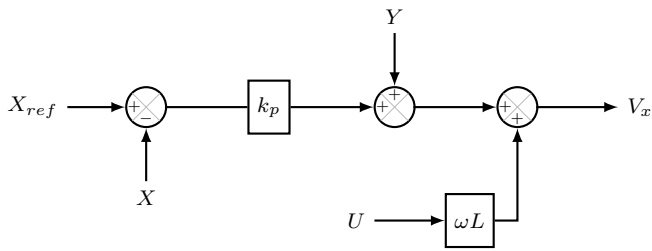


Fig. 4. Simple Control diagram

```

\begin{figure}
\begin{tikzpicture}
  \bStart{$X_{ref}$}
  \bMinusDown{$X$}
  \bGain{$k_p$}
  \bPlusUp{$Y$}
  \bGainPlus{$U$}{$\omega L$}
  \bEnd{$V_x$}
\end{tikzpicture}
\end{figure}

```

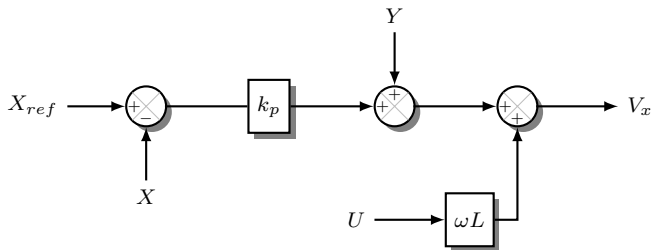


Fig. 5. Control diagram with shadow

```

\begin{figure}
\begin{tikzpicture}
\bShadow
  \bStart{$X_{ref}$}
  \bMinusDown{$X$}
  \bGain{$k_p$}
  \bPlusUp{$Y$}
  \bGainPlus{$U$}{$\omega L$}
  \bEnd{$V_x$}
\end{tikzpicture}
\end{figure}

```

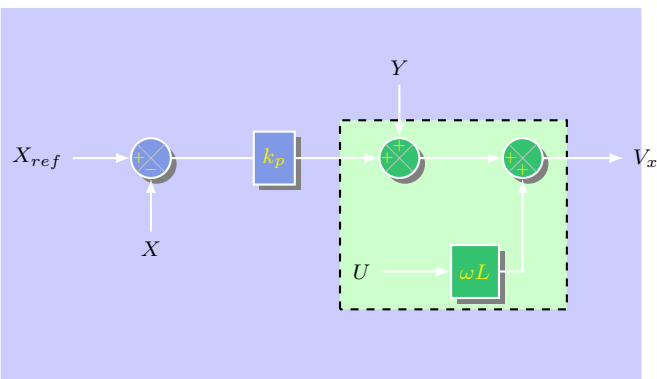


Fig. 6. Control diagram with shadow and different colors

```

\begin{figure}
\begin{tikzpicture}[thick]
  \draw[fill=blue!20, draw=white]
    (-0.5,-3) rectangle (8,2);
  \draw[fill=green!20, dashed]
    (4,-2) rectangle (7,0.5);
  \bShadow
  \bColorB{blue!50!green!45}
  \bColorT{yellow}
  \bColorL{white}
  \bStart{$X_{ref}$}
  \bMinusDown{$X$}
  \bGain{$k_p$}
  \bPlusUp{$Y$}
  \bGainPlus{$U$}{$\omega L$}
  \bEnd{$V_x$}
\end{tikzpicture}
\end{figure}

```


III. history

- add bMultiplyDown on 2025-03-03, by hu zhenzhen
- update on 2021-12-28, by hu zhenzhen (hzzmail@163.com)
 - add new some commands for feed forward drawing
 - add more instructions of cmds in the doc
- v1.0 in 2005, uses TikZ to provide commands for generating control diagrams (specially in power electronics)