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}
\bPlusDown{TEXT}
\bPlusUp{TEXT}
\bMinusDown{TEXT}
\bMinusUp{TEXT}
\bEnd{TEXT}
\bGain{TEXT}

\bGainPlus{TEXT1}{TEXT2}
\bGainMinus{TEXT1}{TEXT2}
```

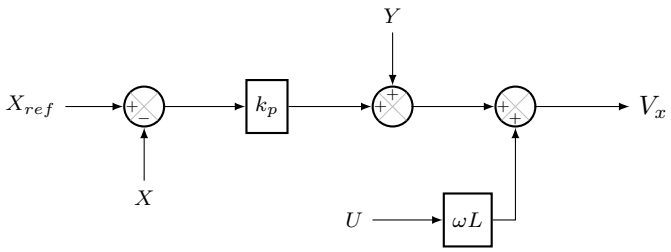
For Feedback controls, it is required to mark the nodes with the following functions:

```
\bMinusF{NODENAME}
\bPlusF{NODENAME}
\bFeedBack{TEXT}{NODENAME}
\bCrossGain{TEXT}{NODENAME1}{NODENAME2}
\bNewStart{TEXT}{POSITION}
\bMarkNode{NODENAME}
\bMarkNodeUp{NODENAME}
\bMarkNodeDown{NODENAME}
```

To change colors and distances, the following functions are available

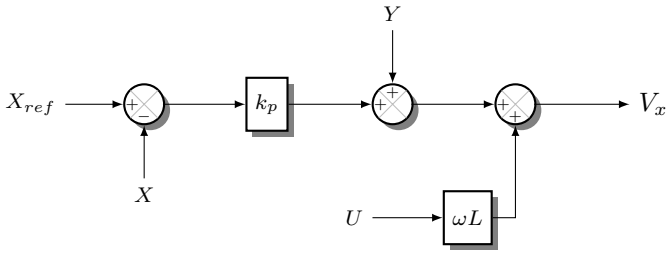
```
\bShadow{NUMBER}   % default = 0
\bColorB{COLOR}    % default = white
\bColorT{COLOR} % default = black
\ydistance{NUMBER} % default = 1.2 cm
```

II. EXAMPLES



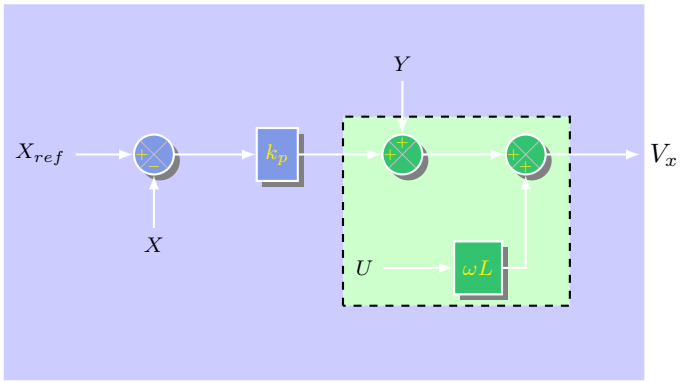

```
\begin{figure}
\begin{tikzpicture}
  \bStart{$X_{ref}$}
  \bMinusDown{$X$}
  \bGain{$k_{p}$}
  \bPlusUp{$Y$}
  \bGainPlus{$U$}{$\omega L$}
  \bEnd{$V_{x}$}
\end{tikzpicture}
\end{figure}
```

Fig. 1. Simple Control diagram



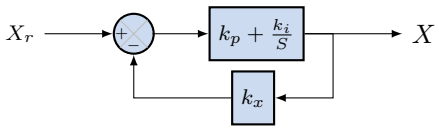

```
\begin{figure}
\begin{tikzpicture}
 \bShadow
   \bStart{$X_{ref}$}
   \bMinusDown{$X$}
   \bGain{$k_{p}$}
   \bPlusUp{$Y$}
   \bGainPlus{$U$}{$\omega L$}
   \bEnd{$V_{x}$}
\end{tikzpicture}
\end{figure}
```

Fig. 2. Control diagram with shadow



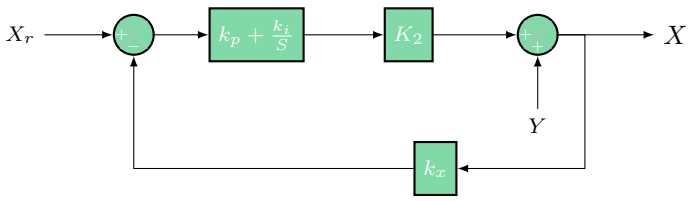

```
\begin{figure}
\begin{tikzpicture}[thick]
\draw[fill=blue!20, draw=white]
   (-0.5,-3) rectangle (8,2);
  \draw[fill=green!20, dashed]
     (4,-2) rectangle (7,0.5);

 \bShadow
 \bColorB{blue!50!green!45}
 \bColorT{yellow}
 \bColorL{white}
   \bStart{$X_{ref}$}
   \bMinusDown{$X$}
   \bGain{$k_{p}$}
 \bColorB{blue!30!green!80}
   \bPlusUp{$Y$}
   \bGainPlus{$U$}{$\omega L$}
   \bEnd{$V_{x}$}
\end{tikzpicture}
\end{figure}
```

Fig. 3. Control diagram with shadow and different colors



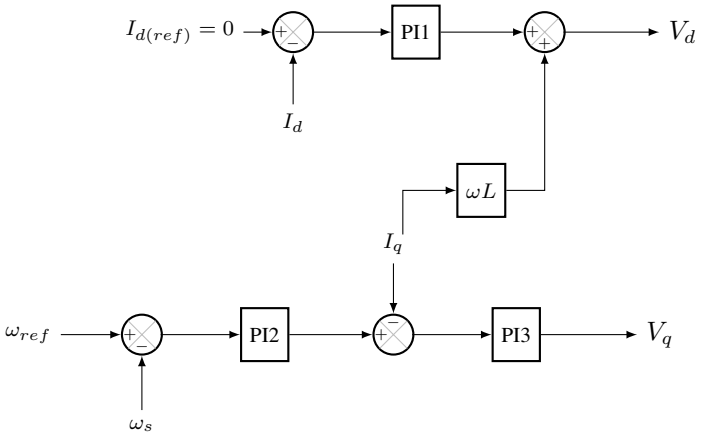

```
\begin{figure}
\begin{tikzpicture}
  \bColorB{blue!70!green!20}
  \bStart{$X_{r}$}
\bMinusF{NODEX}
  \bGain{$k_{p}+\frac{k_{i}}{S}$}
\bFeedBack{$k_{x}$}{NODEX}
  \bEnd{$X$}
\end{tikzpicture}
\end{figure}
```

Fig. 4. Control diagram with feedback




```
\begin{figure}
\begin{tikzpicture}
   \bColorB{blue!30!green!50}
   \bColorT{white}
   \bStart{$X_{r}$}
   \bMinusF{NODEX}
   \bGain{$k_{p}+\frac{k_{i}}{S}$}
   \bGain{$K_{2}$}
   \bPlusDown{$Y$}
\ydistance{2.5cm}
   \bFeedBack{$k_{x}$}{NODEX}
   \bEnd{$X$}
\end{tikzpicture}
\end{figure}
```

Fig. 5. Change the ydistance




```
\begin{figure}
\begin{tikzpicture}
\bStart{$I_{d(ref)}=0$}
  \bMinusDown{$I_{d}$}
  \bGain{PI1}
  \bPlusF{NODET}
  \bEnd{$V_{d}$}
\bNewStart{$\omega_{ref}$}{(-2,-4)}
  \bMinusDown{$\omega_{s}$}
  \bGain{PI2}
  \bMinusUp{$I_{q}$}
\bMarkNodeUp{NODEX}
  \bGain{PI3}
  \bEnd{$V_{q}$}
\bCrossGain{$\omega L$} {NODEX} {NODET}
\end{tikzpicture}
\end{figure}
```

Fig. 6. More compex controls