

kBLOCKS Package

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I. INTRODUCTION

Welcome to the demo documentation of *kBLOCKS*. Desiring to typeset control block diagrams in \LaTeX and dissatisfied with the other \LaTeX macro packages that can be found online, I thought: *why not write my own macro package for this purpose.*

I wish to start with the question, “What is *kBLOCKS*?” The *kBLOCKS* macro package is the product of using *TikZ/PGF* to directly typeset beautiful control block diagrams and signal flow graphs in my Masters’ dissertation and papers directly with \LaTeX . Basically, it just defines a dedicated “*kblock*” environment and a number of macro commands to make drawing control block diagrams using *TikZ/PGF* more structured and easier. In a sense, when you use *kBLOCKS* you *program* or typeset graphics for control block diagrams, just as you “program” graphics in your document when you use \LaTeX using *TikZ/PGF*.

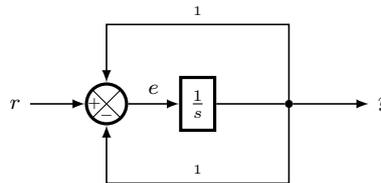
The powerful options offered by *TikZ/PGF* often intimidates beginner users not ready to spend careful time learning about *TikZ/PGF*. Like all \LaTeX packages, *TikZ/PGF* inherits the steep learning curve of \LaTeX , that is, no *what you see is what you get*. The *kBLOCKS* macro reduces the length of this learning curve, by focusing the graphics theme on control block diagrams only. Fortunately this documentation as it grows and gets to be improved, will come with a number of slowly-paced tutorials, which will guide you on creating control block diagrams with *kBLOCKS* without your having to read the *TikZ/PGF* manual.

My wish is that you do find it useful and helpful. Please, don’t forget to share and like if you did.

I will readily welcome any e-mails for improvement or suggestion with respect to using *kBLOCKS* and making it useful for researchers, students and others involved in the applications and field of control theory.

II. DEMOS

A.

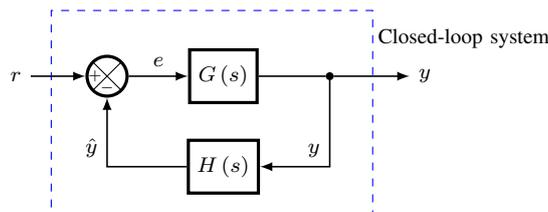


```

1 \begin{kblock}
2   \kStartNode[ $r$ ]{R1}
3   \kPlusMinusDown{R1}{S1}{0cm}
4   \kTFRight[0cm]{S1}{B1}{ $\frac{1}{s}$ }
5   \kMarkNodeRight[0cm]{}{B1}{N1}
6   \kOutRight{N1}{Y1}{ $y$ }{0cm}
7
8   \kLinkVHHVAbove[0cm]{$1$}{N1}{S1}{0}{0}
9   \kLinkVHHVBelow[0cm]{$1$}{N1}{S1}{0}{0}
10  \kLink[] {R1}{S1}
11  \kLink[ $e$ ] {S1}{B1}
12  \kLinkn[] {B1}{N1}
13 \end{kblock}

```

B.

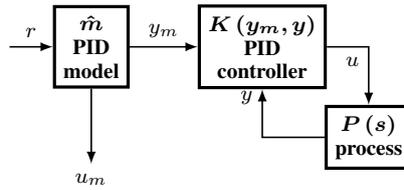


```

1 \begin{kblock}
2   \kStartNodec[{$r$}]{(0,5)}{R1}
3   \kPlusMinusDown{R1}{S1}{0cm}
4   \kTFRight[0.33cm]{S1}{B1}{\mathleft(s\right)}$}
5   \kTFBelow[0cm]{B1}{B2}{\mathleft(s\right)}$}
6   \kMarkNodeRight[0.2cm]{}{B1}{N1}
7   \kOutRight{N1}{Y1}{\mathleft(s\right)}$}
8
9   \kLinkVHTFHVBelow{Y1}{\mathleft(s\right)}{N1}{B2}{S1}{0}{0}{0}
10  \kLink[]{}{R1}{S1}
11  \kLink[{$e$}]{S1}{B1}
12  \kLinkn[]{}{B1}{N1}
13
14  \kCoverRect[blue]{B1}{0.5cm}{1.5cm}{1.8cm}{1.5cm}
15  \kCoverTextRight{1cm}{0.5cm}{TX1}{Closed-loop system};
16 \end{kblock}

```

C.

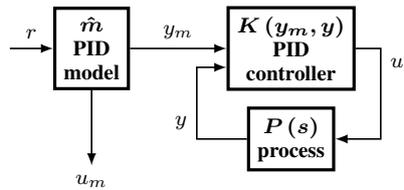


```

1 \begin{kblock}
2   \kStartNodec[]{(5,-5)}{R1}
3   \kTFRight{R1}{M1}{\mathleft(m\right)}$} \textbf{PID} \textbf{model}}
4   \kOutDown[]{}{M1}{um}{\mathleft(s\right)}$}
5   \kScaleDistX[1.5]
6   \kTFRight{M1}{C1}{\mathleft(K\left(y_m,y\right)\right)}$} \textbf{PID} \textbf{controller}}
7   \kTFBelowRight[0cm]{0.2cm}{C1}{P1}{\mathleft(P\left(s\right)\right)}$} \textbf{process}}
8
9   \kLink[{$r$}]{R1}{M1}
10  \kLink[{$y_m$}]{M1}{C1}
11  \kLinkHV[{$u$}]{C1}{P1}{north}{0}
12  \kLinkHV[{$y$}]{P1}{C1}{south}{0}
13 \end{kblock}

```

D.

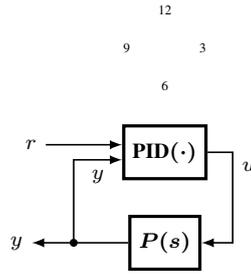


```

1 \begin{kblock}
2   \kStartNodec[]{(-5,-5)}{R1}
3   \kTFRight{R1}{M1}{\mathleft(m\right)}$} \textbf{PID} \textbf{model}}
4   \kOutDown[]{}{M1}{um}{\mathleft(s\right)}$}
5   \kScaleDistX[1.75]
6   \kTFRight{M1}{C1}{\mathleft(K\left(y_m,y\right)\right)}$} \textbf{PID} \textbf{controller}}
7   \kScaleDistX[1]
8   \kTFBelow{C1}{P1}{\mathleft(P\left(s\right)\right)}$} \textbf{process}}
9
10  \kLink[{$r$}]{R1}{M1}
11  \kLink[{$y_m$}]{M1}{C1}
12  \kLinkHVHRight[0]{}{C1}{P1}{0}{0}
13  \kLinkHVHLeft[0.33]{}{P1}{C1}{0}{-0.25}
14 \end{kblock}

```

E.

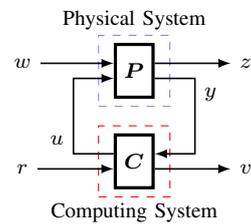


```

1 \begin{kblock}
2   \kJumpCS{R}{$(0,0)$}
3
4   \kJumpCSRight[-0.5cm]{R}{CR}{0}{3}
5   \kJumpCSLeft[-0.5cm]{R}{CR}{0}{9}
6   \kJumpCSAbove[-0.5cm]{R}{CR}{0}{12}
7   \kJumpCSBelow[-0.5cm]{R}{CR}{0}{6}
8
9   \kTFBelow{R}{C1}{\bfseries{PID}$\bm{(\cdot)}$}
10  \kScaleDistX[0.67]
11  \kTFBelow{C1}{P1}{\bm{P(s)}$}
12  \kScaleDistX[1]
13
14  \kInLeft[0cm]{C1}{R1}{r$}{0.1}
15
16  \kMarkNodeLeft[0cm]{}{P1}{ON}
17  \kLinkn[]{}{P1}{ON}
18  \kOutLeft[-0.5cm]{ON}{Y}{y$}{0}
19  \kLinkVH{y$}{ON}{C1}{west}{-0.1}
20
21  \kLinkHVHRight[0]{u$}{C1}{P1}{0}{0}
22 \end{kblock}

```

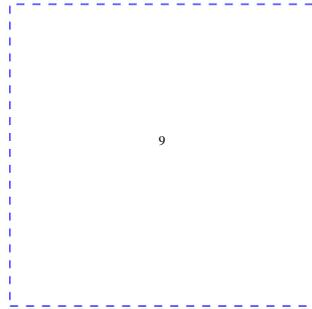
E.



```

1 \begin{kblock}
2   \kJumpCS{R1}{$(5,5)$}
3
4   \kTFRight{R1}{P1}{\bm{P}$}
5   \kScaleDistX[0.67]
6   \kTFBelow{P1}{C1}{\bm{C}$}
7   \kScaleDistX[1]
8
9   \kInLeft[]{}{P1}{R1}{w$}{0.1}
10  \kInLeft[]{}{C1}{R1}{r$}{-0.1}
11
12  \kLinkHVHRight[0.2]{y$}{P1}{C1}{-0.1}{0.1}
13  \kLinkHVHLeft[0.2]{u$}{C1}{P1}{0.1}{-0.1}
14
15  \kOutRight[0cm]{P1}{Z}{z$}{0.1}
16  \kOutRight[]{}{C1}{V}{v$}{-0.1}
17
18  \kCoverRect[blue!50!]{P1}{0.1cm}{0.1cm}{0.2cm}{0.2cm}
19  \kCoverTextAbove{0}{0}{TX1}{Physical System};
20
21  \kCoverRect[red]{C1}{0.1cm}{0.1cm}{0.2cm}{0.2cm}
22  \kCoverTextBelow{0cm}{0cm}{TX2}{Computing System};
23 \end{kblock}

```

G.

```
1 \begin{kblock}
2 \kJumpCS{io}{$(0,0)$}
3 \kJumpCSLeft[-0.5cm]{io}{j1}{0}{9}
4 \kCoverRect[blue]{j1}{2cm}{2cm}{2cm}{2cm}
5 \end{kblock}
```